MAY 1, 1913

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**Indianapolis, U. S. A.**

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***Electric generators have heretofore been subject to criticism on account of their inefficiency and unreliability.***

**The Bailey Electric Generator, a wonderful dynamo only 5¼" high, 5¼" wide and 7¼" long, weighing 17 pounds, designed by Benjamin F. Bailey, the famous Electrical Engineer, furnishes the first logical solution of the electric lighting problem.**

**In its construction, all unsatisfactory and trappy devices, such as reverse current relays, magnetic switches, vibrating contacts, delicate rheostats, slipping clutches, corroding platinum points and other trouble making appliances have been entirely eliminated.**

**Furthermore, there are no moving parts involved in the Bailey System of Regulation.**

**A patented mercury switch, the very simplicity of which has foiled other inventors, makes the construction of this generator so simple and compact, that in spite of the fact that its output running from 10 to 15 amperes is almost double that of other generators, the entire mechanism is little larger than a man's hand.**

**Another thing—due to its peculiar construction, when the big headlights are thrown on, it automatically supplies the additional current required for their lighting.**

**You are always assured of brilliant lights on all your lamps, and a sufficient reserve in the battery to take care of emergencies.**

### Prices of Complete Outfit

Model L 1, suitable for car lighting systems requiring 60 candlepower or less, $75.00.

This price includes generator, wiring, harness, 60-ampere hour storage battery and all controlling switches ready for installation. Price f.o.b. Grand Rapids.

Model L 2, suitable for car lighting systems requiring 60 to 100 candlepower, $125.00.

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**Suite 6—Goldberg Building,**
**DETROIT, MICH.**

## THE BAILEY ELECTRIC CO.

GRAND RAPIDS. MICHIGAN . U.S.A.

VOL. XXVIII NEW YORK—THURSDAY, MAY 1, 1913—CHICAGO No. 18

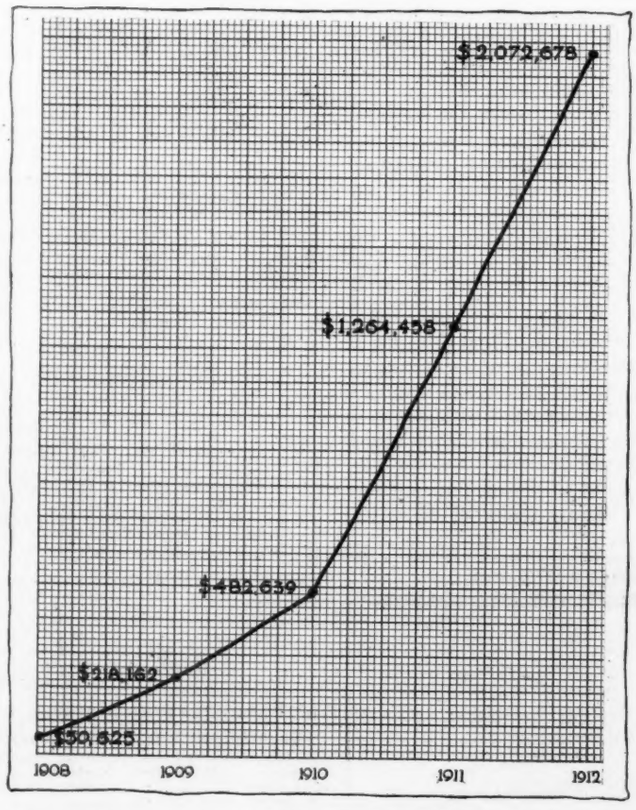
The AUTOMOBILE

# Australia—A Fine Export Field

## Total Imports Rose from $6,007,943 in 1911 to $9,334,627 in 1912, an Increase of 55.5 Per Cent.—America Leads in Bodies and Is Second to England as Chassis Seller

TWO territories there are in the New World which are just being thrown open to the commerce and industry of the world: South America and Australia. The former, largely in the hands of the original Spanish settlers, is not as quick as its natural resources and possibilities would warrant it; while the latter, under the hands of the British, most successful of colonizing nations, is making most astonishing headway. Agriculture, mining and a variety of industries make Australia a territory of very considerable buying power, and that the automobile industry of the world is getting its share will be shown in the following article.

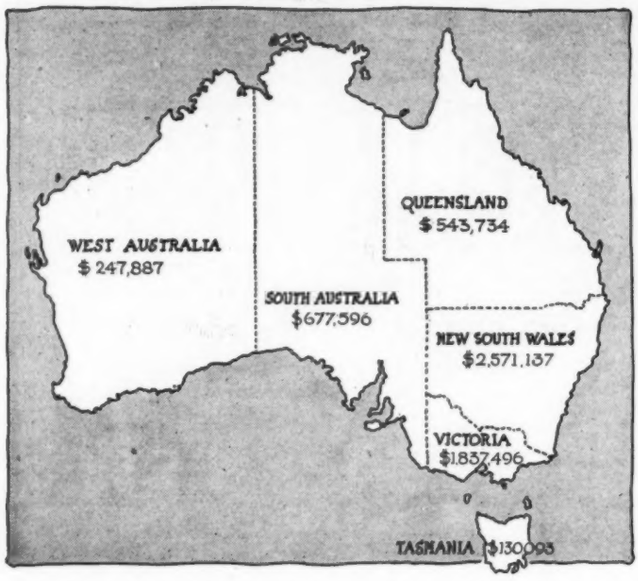
The present status of automobilism in Australia has been dealt with statistically in an article published in THE AUTOMOBILE of October 31, 1912. It will now be shown how the number of automobiles in Australia is on a rapid increase, as a fitting illustration of the good chances and the success of American automobile exporters. Australian automobile imports during 1911 and 1912, according to government figures, are our material used in this article.




Curve showing the steady rise of American exports to Australia, which increased fortyfold in 4 years

The most interesting phase of the whole situation—the import of American automobiles—is illustrated by the curve appearing on this page. From the modest figure of $50,625 of the cars imported from the United States in 1908, this value has risen during the subsequent 4 years to forty times its magnitude, or $2,072,678. The rate of increase of American exports to Australia has been rising continually, as is shown by the steepening slope of the curve.

Details of automobile imports from America to Australia are shown in the diagram on page 920. The total amounts for the last 2 years have been dissected in the case of this diagram, showing the value of chassis, bodies and of motorcycles, including cyclecars, for both years, the 1911 values being represented by spaces filled with dot-shading and those of 1912 by line-




Distribution of 1911 imports through Australian states

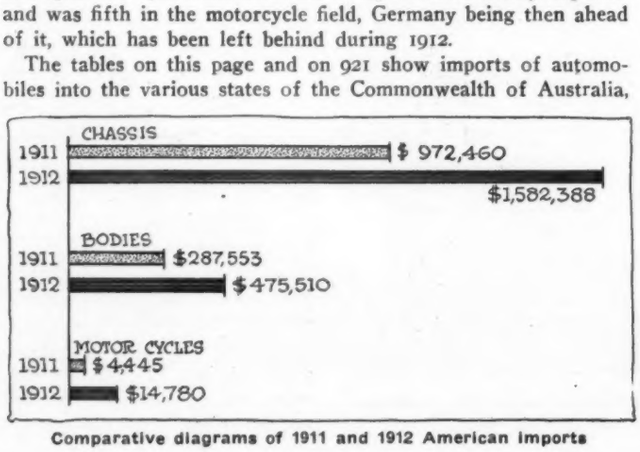
shaded spaces. The value of chassis imports in 1911 was $972,460 and in 1912 $1,582,388, equivalent to an increase of 62.5 per cent. Bodies imported from the United States rose in value from $287,553 in 1911 to $475,510 in 1912, the increase amounting to $187,957, or 65 per cent. Motorcycle and cyclecar imports rose from $4,445 to $14,780, an increase of $10,355, or 233 per cent.

## America Supplied 10 Per Cent. in 1912

The total value of automobile chassis and bodies, including both passenger and commercial types, exported from the States to Australia during 1912 is $2,057,898. Assuming that the average value of each car exported was $1,000—a reasonable estimate—this means that somewhat more than 2,000 automobiles were sold in Australia in that year. If the total number of cars in Australia at the close of 1912 was 20,000, which is very close to the actual number, **one-tenth of this respectable number had been purchased from American manufacturers during that very year.** It should be borne in mind, too, that the values given in the diagram on this page do not include the prices paid for tires on the cars, but merely those of the products of the automobile industry proper.

So far as bodies are concerned, the United States was the leading exporter to Australia in 1912, but in respect of total chassis value it ranked second to the United Kingdom, while in regard to motorcycles and cyclecars it was only fourth, Great Britain, France and Belgium being leaders. But that America is making good progress even in these two regards is shown by comparing the tabulations showing Australian imports for 1911 and 1912. In 1911 America ranked only as second body exporter and was fifth in the motorcycle field, Germany being then ahead of it, which has been left behind during 1912.

The tables on this page and on 921 show imports of automobiles into the various states of the Commonwealth of Australia,




Comparative diagrams of 1911 and 1912 American imports

with the exporting countries arranged in the order of their export values. Even a superficial inspection of these tabulations brings out the fact that America's principal rival is Great Britain, who controls Australian imports in many fields and therefore holds supremacy in automobiles as well. But the steady advance of American exports, as shown by its first position on the 1912 body table, cannot be denied. Another fact shown by these tables is that France ranks among the principal exporters, although she seems to be falling behind. Indeed, her chassis exports increased by the amount of $176,058 during 1912; her body exports increased $11,744, but the small-car trade shows a falling-off amounting to $690. This may seem to be a small amount, but as every country has been trying its best in its Australian trade during the past 2 years, even this decrease is significant. A different and pleasant situation obtaining with regard to the United States' exports is revealed by comparing the French figures with those illustrated by the diagram at the bottom of the page.

An extraordinary gain in chassis exports is seen in the case of Canada; her 1912 trade exceeds that of 1911 by $437,521, the gain being 205 per cent. This puts her fourth among chassis-supplying countries. Italy is making reasonable progress and Belgium's trade develops at about the same rate. Germany showed a gain of just $100,000 during 1912. Swiss trade fell off, the loss being $8,671. Austria-Hungary's exports fell $3,108 and those of the Netherlands $8,558, or 91 per cent. Sweden, however, showed an increase of $11,354, or 96.5 per cent.

The tabulation of Australian body imports shows a similar situation. Except for the fact that the United States took first place in 1912 and the United Kingdom second, reversing the positions of the preceding year, the order of countries that exported to the Commonwealth remained much the same as before. Canada remained third, more than doubling her trade; France retained fourth place, although she lost $11,744, or 26 per cent. of her exports; Germany followed in both years, gaining slightly during 1912; in that year Italy overtook Belgium, the former gaining $4,238, or 159 per cent., while the latter's export business fell from $7,757 to $4,704, the loss being 39 per cent. New Zealand almost doubled her trade and that of Switzerland rose

### AUTOMOBILE CHASSIS IMPORTED INTO AUSTRALIA DURING 1911

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. Kingdom | 893,700 | 519,600 | 215,000 | 309,300 | 82,960 | 55,560 | 2,076,120 |
| U. S. A.... | 477,300 | 200,700 | 152,500 | 84,920 | 35,750 | 21,290 | 972,460 |
| France ..... | 320,300 | 377,800 | 58,390 | 83,850 | 38,300 | 9,196 | 887,836 |
| Italy ..... | 133,200 | 146,700 | 2,659 | 15,060 | 13,610 | 9,585 | 320,814 |
| Belgium .... | 114,000 | 95,190 | 4,631 | 13,000 | ..... | 998 | 227,819 |
| Canada ..... | 67,200 | 113,100 | 1,281 | 30,110 | 2,830 | ..... | 214,521 |
| Germany ... | 73,810 | 79,320 | 502 | 11,711 | 53 | 9,010 | 174,416 |
| Switzerland. | 6,822 | 21,740 | 1,057 | 7,291 | 4 | ..... | 36,914 |
| Austria ..... | 20,460 | ..... | ..... | ..... | ..... | ..... | 20,460 |
| Sweden .... | 11,710 | ..... | ..... | ..... | ..... | ..... | 11,710 |
| Holland .... | ..... | 9,428 | ..... | ..... | ..... | ..... | 9,428 |
| | 2,118,502 | 1,563,578 | 436,020 | 555,242 | 173,517 | 105,639 | 4,952,498 |

### BODIES AND PARTS THEREOF IMPORTED DURING 1911.

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. Kingdom. | 143,170 | 88,694 | 31,008 | 39,907 | 35,765 | 8,030 | 346,574 |
| U. S. A.... | 141,398 | 59,923 | 46,483 | 21,298 | 10,392 | 8,059 | 287,553 |
| Canada .... | 13,858 | 26,837 | 466 | 9,523 | 8,179 | ..... | 58,863 |
| France ..... | 16,690 | 13,358 | 5,640 | 3,965 | 4,104 | 1,325 | 45,082 |
| Germany ... | 13,027 | 4,622 | 134 | 2,400 | 62 | 67 | 20,312 |
| Belgium .... | 2,947 | 3,475 | ..... | 1,109 | 226 | ..... | 7,757 |
| Italy ..... | 912 | 1,450 | 10 | 139 | 139 | ..... | 2,650 |
| Austria .... | 1,181 | ..... | ..... | ..... | ..... | ..... | 1,181 |
| N. Zealand.. | 341 | ..... | ..... | ..... | ..... | ..... | 341 |
| Holland .... | ..... | ..... | 211 | ..... | ..... | ..... | 211 |
| Sweden ..... | 53 | ..... | ..... | ..... | ..... | ..... | 53 |
| Switzerland. | ..... | 24 | ..... | ..... | ..... | ..... | 24 |
| | 333,577 | 198,383 | 83,952 | 78,341 | 58,867 | 17,481 | 770,601 |

### MOTORCYCLES AND SMALL CARS IMPORTED DURING 1911

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. Kingdom. | 94,190 | 67,070 | 18,050 | 40,800 | 13,190 | 6,492 | 239,792 |
| France ..... | 15,490 | 1,228 | ..... | 2,371 | 1,183 | ..... | 20,272 |
| Belgium ... | 5,454 | 2,664 | 4,996 | 165 | 1,130 | ..... | 14,409 |
| Germany ... | 2,571 | 2,016 | ..... | 677 | ..... | 243 | 5,507 |
| U. S. A.... | 1,353 | 2,557 | 297 | ..... | ..... | 238 | 4,445 |
| Switzerland.. | ..... | ..... | 419 | ..... | ..... | ..... | 419 |
| | 119,058 | 75,535 | 23,762 | 44,013 | 15,503 | 6,973 | 284,844 |

to five times of what it had been in 1911. Austria lost somewhat and Sweden disappeared entirely; the same applies to the Netherlands. On the other hand, Japan and the Commonwealth are new additions to the list.

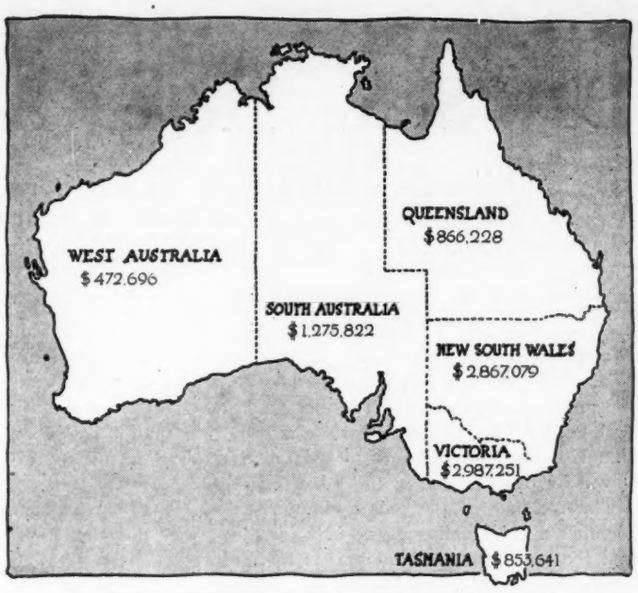
In the motorcycle and cyclecar class, the United States advanced from the fifth to the fourth position, displacing Germany. France was the only loser in this class of imports, all other countries showing gains. In 1912 New Zealand appeared on the list for the first time.

It would be utterly wrong, however, if anyone would be inclined to consider Australia as one uniform territory throughout which the same conditions hold good. The Australian continent is divided into five states which, together with the island of Tasmania, constitute the Commonwealth. The following tabulation shows the total imports of all sates for 1911 and 1912, with the percentage of increase during the latter year, the states being arranged in order of the automobile registrations:

| State | 1911 | 1912 | Increase Per Cent. |
|---|---|---|---|
| New South Wales | $2,571,137 | $2,867,079 | 11.5 |
| Victoria | 1,837,496 | 2,987,251 | 57.2 |
| South Australia | 677,596 | 1,275,822 | 89.6 |
| Queensland | 543,734 | 866,228 | 59.4 |
| West Australia | 247,887 | 472,696 | 90.6 |
| Tasmania | 130,093 | 853,641 | 556.5 |

This shows that the demand for automobiles is very strong all through the Commonwealth, but that the import rates rise most in the territories which have the least numbers of cars, Tasmania having about 600 at the end of last year. New South Wales, on the other hand, had some 6,500 cars, or ten times as many as Tasmania; but the rate of import increase is only one-fiftieth of that of the latter. This indicates that the island is a specially hopeful territory which has hardly been touched yet. Queensland's registration is just in the middle between the numbers of West and South Australia, so that her percentage of rise should be about 90; instead it is only about 60, showing either that the state has not received proper care from automobile dealers or that conditions there are not as favorable for automobiling as elsewhere.

In the previous article mentioned above, which treated of the status of the automobile in Australia, it was stated that Ford registrations were about 50 per cent. ahead of any other make, showing the prevalence of low-priced American cars. It was also stated then, that Australians have a preference for American bodies due their greater comfort. That there is truth in this argument, is now being shown by the lead of the United States in the line of body imports. The other arguments in favor of American cars, low price, easy-riding suspensions and full equipment are also of great consequence in introducing United States made products in the Commonwealth.



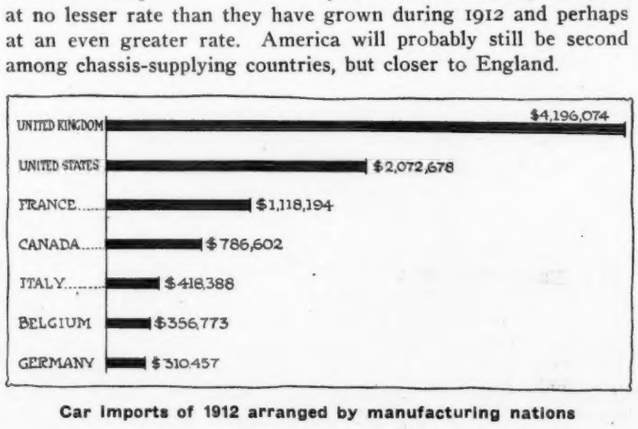

Distribution of 1912 imports through Australian states

## How To Go About Australian Trade

It may not be out of place to state here that British exporters to Australia as well as patriotic importers of English origin have grave apprehensions with regard to the American trade. The danger, so-called, of an invasion of the land by American products is felt more in Australia than in many other countries, because the Commonwealth is still very much in its growing period.

Information about Australia is continuously coming in, especially through the United States Consulates established in the various cities. It will be advisable for any maker who desires to export to the Australian continent, to communicate with the Department of Commerce and Labor for information regarding the local conditions obtaining in the various states and their parts, as such a knowledge is a requisite in making a success in automobile exporting.

Judging from general conditions in Australia, which are favorable to business, it is more than highly probable that American automobile exports to that country will increase during this year at no lesser rate than they have grown during 1912 and perhaps at an even greater rate. America will probably still be second among chassis-supplying countries, but closer to England.




Car imports of 1912 arranged by manufacturing nations

### AUTOMOBILE CHASSIS IMPORTED INTO AUSTRALIA DURING 1912

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. Kingdom | 785,808 | 817,978 | 332,861 | 427,075 | 121,498 | 762,816 | 3,248,036 |
| U. S. A. | 545,122 | 460,834 | 229,512 | 221,779 | 88,013 | 37,128 | 1,582,388 |
| France | 298,022 | 526,848 | 96,715 | 126,427 | 11,048 | 4,834 | 1,063,894 |
| Canada | 159,749 | 242,314 | 25,493 | 147,202 | 77,083 | ..... | 651,841 |
| Italy | 205,935 | 173,808 | 7,406 | 17,098 | 7,253 | ..... | 411,500 |
| Belgium | 126,442 | 158,270 | 18,475 | 26,323 | 1,666 | 1,243 | 332,419 |
| Germany | 121,032 | 138,346 | 82 | 9,987 | 4,397 | 164 | 274,008 |
| Switzerland | 5,400 | 13,685 | 3,192 | 5,966 | ..... | ..... | 28,243 |
| Sweden | 23,064 | ..... | ..... | ..... | ..... | ..... | 23,064 |
| Austria | 12,797 | 3,902 | 653 | ..... | ..... | ..... | 17,352 |
| Holland | 878 | ..... | ..... | ..... | ..... | ..... | 878 |
| N. Zealand | ..... | 19 | ..... | ..... | ..... | ..... | 19 |
| | 2,284,249 | 2,536,004 | 714,389 | 981,857 | 310,958 | 806,185 | 7,633,642 |

### BODIES AND PARTS THEREOF IMPORTED DURING 1911

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. S. A. | 149,584 | 129,078 | 68,381 | 81,509 | 35,510 | 11,448 | 475,510 |
| U. Kingdom | 137,611 | 115,882 | 33,739 | 75,917 | 35,323 | 10,306 | 408,778 |
| Canada | 34,824 | 32,117 | 5,314 | 37,594 | 24,912 | ..... | 134,711 |
| France | 13,751 | 9,610 | 4,197 | 2,261 | 2,813 | 706 | 33,338 |
| Germany | 12,754 | 10,330 | ..... | ..... | 1,795 | ..... | 24,879 |
| Italy | 4,253 | 1,296 | ..... | ..... | 1,339 | ..... | 6,888 |
| Belgium | 2,208 | 2,074 | ..... | ..... | ..... | 422 | 4,704 |
| Austria | 1,126 | ..... | ..... | ..... | ..... | ..... | 1,126 |
| Japan | 662 | ..... | ..... | ..... | ..... | ..... | 662 |
| N. Zealand | 360 | 269 | ..... | ..... | ..... | ..... | 629 |
| Com'nwealth | 201 | ..... | ..... | ..... | ..... | ..... | 201 |
| Switzerland | 158 | ..... | ..... | ..... | ..... | ..... | 158 |
| | 357,492 | 300,656 | 111,631 | 197,281 | 101,692 | 22,882 | 1,091,634 |

### MOTORCYCLES AND SMALL CARS IMPORTED DURING 1911

| Country | N. S. W. | Vict. | Queen'd | S. Aus. | W. Aus. | Tasm. | Total |
|---|---|---|---|---|---|---|---|
| U. Kingdom | 192,400 | 142,100 | 36,760 | 94,100 | 52,060 | 21,430 | 539,260 |
| France | 13,420 | 2,717 | 195 | 657 | 3,934 | 39 | 20,962 |
| Belgium | 10,330 | 4,719 | 3,238 | 1,363 | ..... | ..... | 19,650 |
| U. S. A. | 3,959 | 4,276 | 15 | 399 | 3,526 | 2,605 | 14,780 |
| Germany | 4,757 | 6,609 | ..... | 165 | 39 | ..... | 11,570 |
| Switzerland | 472 | ..... | ..... | ..... | 487 | ..... | 959 |
| N. Zealand | ..... | 170 | ..... | ..... | ..... | ..... | 170 |
| | 225,338 | 160,591 | 40,208 | 96,684 | 60,046 | 24,574 | 607,351 |

# Bay State Hopes To Defeat Truck Bills

*Automobile and Motor Truck Interests Present Solid Phalanx of Opposition to Attempt to Tax Commercial Motor Vehicles Without Levying on Horse-Drawn Wagons—Decision Regarding Duties of Automobilists in Case of Accident—New York Cuts Chauffeur's Fee from $5 to $2.*

BOSTON, April 28—The fight of the motorists of Massachusetts assisted by the National Association of Automobile Manufacturers to prevent the increase of motor truck registrations to $5 per ton, has progressed so that today it looks as if the proposed legislation will be defeated and, if so, a good work will be done for the entire truck industry, in that it is certain that if Massachusetts were to pass such a law it would be followed by other states in the near future.

The meeting of the motor committee last Thursday brought together a large gathering of men identified with different lines, and the sentiment was unanimous to conduct a general fight to entirely bury the scheme of taxing the commercial truck industry when horse-drawn trucks are not taxed. The purpose now is to make a political campaign as there are enough men identified with the motor industry to swing an election if opinion were molded so that the electorate would get the real facts, and already a few of the progressives are at work on it to take advantage of the situation.

## Commissioners Go Out of Their Field

The opinion is general in this state that the highway commission was responsible for giving the committee on roads and bridges, which has the proposed legislation in hand, a wrong idea which led this committee to report favorably on the $5 per ton tax. From the opinions of many of the legislators and senators there is a strong feeling that the highway commission would make better progress by sticking to its executive duties and leaving legislative matters alone.

The state house was fairly seething with opposition last week when the work of the motorists began. Constituents began to let members of the legislature hear from them. It was learned that the motor truck increase is one of the measures that the Republican party intended to push across when its legislative members had a meeting recently. So notice was served on the Republican leaders that it will be held responsible for what happens. The Democratic party does not favor it, and from the political viewpoint it begins to look like another of the little jokes of Governor Foss that will prove a jolt to the G. O. P. this fall.

The motor interests are now united so that next fall literature will be sent out to all the districts throughout the state, to every voter, giving a résumé of what has happened during the past few years. There is a general feeling that this literature will have its effect, and with the progressive party moving forward shrewd followers of political affairs look for a change in governorship, with the motorists' vote united.

There has been further opposition in Massachusetts to the appointment of a commission for uniform motor legislation throughout New England. The committee on roads and bridges reported "No legislation necessary," on Governor Foss' recommendation to have a committee appointed to confer with commissioners from other states on uniform motor laws. When Governor Sulzer of New York made the suggestion that he was ready to appoint such a commission, Colonel Schier, of the Massachusetts Highway Commission, in an interview in a Boston paper, stated there was no need for such a commission being appointed, as the Massachusetts law was adequate for present needs. Today Maine has appointed such a commission; New Hampshire will probably follow suit, and possibly Rhode Island. In view of this, the action of the Massachusetts commission came as a surprise, and the motor interests wondered if it were to checkmate any plan to have the present truck bill dropped to such a commission for consideration during the coming summer. Under these conditions it means now a fight on the part of the motorist to kill the bill entirely, and having been fooled once through compromise another one will not be accepted.

That such an interstate commission on uniform laws is necessary is shown by the progressive amendments passed in Maine and New Hampshire this year whereby a neutral zone of 15 miles has been established, to offset the "10 days in one year" clause that was jammed through the Massachusetts legislature by the highway commission and caused other states to adopt it, only to find out it was a boomerang needing a change. The stand-pat feeling that has permeated the atmosphere of Massachusetts for a number of years has woven itself into the motor legislation with ill effect.

The Massachusetts Highway Commission, in a recent decision, has made it plain that it does not consider that when a motorist figures in an accident whereby he causes damage to a person or property that to merely stop so that the number of the car may be taken does not constitute a compliance with the law, but that he must not only stop, but give his name and address in order to make himself known.

The Automobile Legal Association of Boston to make it clear to motorists about this law states that a number of motorists in the past year have been so unfortunate as to kill dogs, and because they failed to stop and make themselves known they have been liable to criminal prosecution, but rather than take the chance of a conviction they have paid various sums as damages for killing the animals, which they would not have been obliged to pay had they stopped and made themselves known as provided by law. A person cannot be held liable for killing a dog unless he is operating his machine recklessly or in a grossly negligent manner.

## N. Y. Reduces Chauffeurs Fee

ALBANY, N. Y., April 29—*Special Telegram*—At the hearng this afternoon before the committee of Internal Affairs of the Senate on new motor legislation, it was agreed that the license fee for chauffeurs will be reduced from $5 to $2, and that there will not be any fee for renewal. Heretofore there had been a fee of $2 for renewal.

Beyond this little of importance by way of change came up. Secretary of State Mitchell May, desired additional power in his hands for revoking licenses, but it was shown that under the present Callan law there is ample power for such revocation if the causes are specified. There was general opposition to the amendment requiring all operators, whether owners or chauffeurs, to be licensed. The movement to create a Bureau of Inspection and Investigation in the state was entirely killed. The general feeling was that the existing Callan law is entirely satisfactory with the exception of chauffeurs' registrations as mentioned.

ALBANY, N. Y., April 29—Proposed automobile legislation is moving slowly these days. Senator Loren H. White, chairman of the Internal Affairs Committee of the Senate, which is handling all of the legislation, says that there will be little if any effected this session. Chairman White expects that his bill

authorizing three committeemen of the state to confer with other committeemen from Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware and Maryland to obtain uniform motor laws will be passed.

Chairman White expects that legislation will be enacted giving Secretary of State May power to revoke a license for cause; and, further, that an amendment will be passed which would license all operators without fee or examination.

A public hearing was held on April 23 and at this the Secretary of State was willing to give in on all questions of legislation excepting two. These were: (1) License owners without an examination and without a fee; (2) he wants power to revoke a license of either chauffeur or owner for any cause, a clause which would give him more power than the Czar of Russia, a clause which would give him power to revoke a license if the tail light happened to be blown out by the wind.

At the hearing, Frank D. Lyon, secretary of the New York State Automobile Association, favored levying a wheel tax or issuing licenses to all vehicles using the public thoroughfares with the exception of vehicles of the farmer used by the farmer for his own direct and personal benefit in delivering his product to the market, this exemption being urged because the farmer already pays a direct tax upon his land property for the purpose of maintaining the highways and bridges of the state.

## Lippincott Favors Joint Commission

NEW YORK CITY, April 29—J. H. Lippincott, of New Jersey, favors a commission of states to draft uniform motor laws and is emphatic in his views that the present motor laws are mere patchwork. In an interview with THE AUTOMOBILE he said:

"In reference to the possible work of the joint commissions appointed by the Eastern States for the purpose of drafting recommendations for the adoption of a uniform automobile law, I can, of course, only speak for the policy which New Jersey would probably adopt in such a conference.

"The question of proper registration fees to be charged, the proper regulation of drivers of motor vehicles generally, the disposition of the revenue, and the reorganization of the rules of the road would seem to be the first question which would be taken up by such a commission.

"A matter of equal importance would seem to be the relation which each state should adopt toward the licenses issued by sister states and the adoption of some system which would be an improvement to the present reciprocity acts which have proved only partially satisfactory. No real results can be obtained in this class of legislation without concerted action on the part of all states similarly located.

"I think it is very generally conceded that our motor vehicle laws have been little better than a series of patchwork legislation and unsatisfactory compromises. The motor vehicle has now arrived at a point where the need for scientific laws governing its use and controlling the relation with which the state or states regard it is absolutely necessary.

"For instance, the place which the business automobile should occupy in our laws has been very generally disregarded. The great increase in the use of automobiles for business purposes makes it absolutely necessary that there be a standard law on this subject.

"The various forms of licenses which are necessary should also properly come before such a conference, as well as the question of the exemption of owners of automobiles from personal taxation on them.

"Some method should be developed of automatic regulation and control by some central authority in each state over all licenses, whether they be granted by the state in which they are at the time touring or whether they be granted by a sister state. In fact, there is hardly a provision of our present motor vehicle acts which could not stand considerable revision and simplification.

"It would seem that the first duty of the commission would be to determine on a model law, dealing with the questions generally and capable of being adopted by each and every state represented at the conference.

"The preliminary work of this commission must, of course, be one of investigation, and I would suggest as a member of the commission from New Jersey, that the automobile laws of all the states in the Union, together with similar laws in the foreign countries, be compiled and classified as to subjects, with the idea that the model act which would be drawn would contain the best features of all the laws on this subject."

Mitchell May, secretary of state for New York, is opposed to such a commission as he has expressed himself as follows:

"It is my opinion that there is no necessity for uniform automobile laws in the various states, so far as they concern the home automobile, because it would be an unnecessary interference with the internal affairs of the various states. There should, however, be some plan adopted by all, and by which automobiles could be operated in foreign states. This would avoid unfair discrimination and bring about that comity among the states which is so desirable. The question, however, pertaining to license fees, speed of automobiles, powers of secretary of state, and such, must of necessity be determined by each state for itself."

## Colorado Has State License Law

DENVER, COL., April 25—Colorado's first law for a state license tax upon motor vehicles has been signed by Governor Ammons, and it is estimated that it will add in the neighborhood of $40,000 annually to the state road fund. If the measure is not subjected to a referendum vote of the people it will go into effect the middle of July.

The law provides for a yearly license tax of $2.50 for automobiles of less than 20 horsepower, $5 for 20 to 40, $10 for more than 40, and $2 for motorcycles. It also requires all paid operators to secure a license costing $2. To encourage tourists visitors will be allowed to register their cars without charge for 90 days

## New York Mayor Signs Objectionable Ordinance

NEW YORK CITY, April 30—Mayor Gaynor yesterday signed the Folks ordinance, lowering the speed limit to 10 miles in congested sections of Manhattan and Brooklyn, 15 miles in other sections and 20 miles an hour in outlying parts of the Bronx, Richmond and Queens. The ordinance will go into effect June 1. The mayor vetoed the original Folks ordinance because it placed the burden of proof on the city.

The point in the ordinance which will be most disliked by automobilists is that in the case of any accident, driving faster than 15 miles an hour in any locality will be considered *prima facie* evidence of negligence, and the burden of proof will be upon the automobilist who must show that he is not guilty or become liable to penalty.

COLUMBUS, O., April 28—The attorney-general for Ohio has held that the amendment to the present automobile law for an equal distribution of the surplus money derived from the registration of automobiles in the state among the various counties of the state for road improvement is constitutional. The attorney-general holds that as roads may be considered both of a local and state-wide nature, the principle that taxes are to be spent where raised may be disregarded.

NEW ORLEANS, LA., April 26—Automobile owners, dealers and agents of New Orleans have made a decided protest against the speed limitations provided for in the traffic ordinance shortly to be introduced in the City Council. The ordinance places the speed limit at 8 miles in the business district, 15 miles in the residence section and 20 miles in isolated parts of the city.

# Gilbert Is Lozier President

## Succeeds H. M. Jewett, Who Leaves Lozier Company To Devote Himself to Paige-Detroit Organization

### Harry Lozier Elected Vice-President of Lozier Firm with Fred Gies Secretary and Assistant Treasurer and N. R. Sultes Treasurer

DETROIT, MICH., April 29—Joseph M. Gilbert, who last week resigned as general manager of the United States Tire Company, was today elected president of the Lozier Motor Company, succeeding Harry M. Jewett, whose active connection with the Lozier company will cease, and who in the future will largely devote his efforts to the Paige-Detroit Motor Car Company, of which he is president.

Harry Lozier was elected vice-president of the company; Fred Gies, secretary and assistant treasurer, and N. R. Sultes, treasturer. Mr. Sultes was connected with the Morgan & Wright Company for 20 years, being president of that concern for 10 years, and when the United States Tire Company was formed March 1, 1911, he became assistant treasurer.

No other changes have been made in the Lozier organization. J. G. Perrin remains as engineer, and Works Manager Pollard will continue in that capacity. The output of the factory is to be largely increased. Paul Smith, who was appointed sales manager a few months ago, will continue in that capacity.

The resignation of Mr. Gilbert as general manager of the United States Tire Co. came as a great surprise last week. He was one of the moving spirits in bringing together Hartford, Morgan & Wright, G. & J. and Continental into this new organization a little over 2 years ago, and since that time he has been general manager. Mr. Gilbert has been connected with the trade for 12 years.

No announcements have been made of Mr. Gilbert's successor as general manager of the United States Tire Company.

## Postal Truck Contracts Declared Void

WASHINGTON, D. C., April 30—*Special Telegram*—Contracts for the purchase of more than $100,000 worth of automobiles for the parcel post were declared void today by the Comptroller of the Treasury. Award of these contracts was the last official act, March 3, of Postmaster-General Hitchcock. New bids will have to be advertised for and accepted. Postmaster-General Hitchcock made the award on the theory that he was entitled to advertise for bids and award the contract by provisions of the parcel post act of August 24, 1912, which permitted the expenditure of money for special equipment, but automobiles are not special equipment for the post office department in the opinion of the comptroller of the treasury. "Having no authority to advertise for bids," says the comptroller, "he had no authority to award contracts and the bidders cannot be held to their bids. That they would like to be held and would furnish promptly the 100 automobiles concerned makes no difference." Postmaster-General Burleson is advised by the comptroller that the whole business will have to be undertaken anew.

## Boston May Hold Truck Show in March

BOSTON, MASS., April 28—The question of whether or not Boston will join the ranks of New York and Chicago and discontinue the annual motor truck show will be definitely settled next Wednesday when the matter will be taken up at the annual meeting of the Boston Commercial Motor Vehicle Association. Following the show in March, Manager Chester I. Campbell stated that there would be another show next year at the same time, the only difference being that it would open on Tuesday evening and close Saturday night instead of starting Wednesday and running through to Wednesday of the week following. At that time he had twenty-four applications for space.

## To Make Washington Cars and Trucks

HYATTSVILLE, MD., April 28—The Washington Motor Car Co. has been incorporated under the laws of Delaware with a capitalization of $300,000 to continue the manufacture of Washington passenger cars and motor trucks on a large scale. A. Gary Carter, president of the company, and Frank L. Carter, secretary, have purchased the plant and assets of the Carter Motor Car Corp., of this city, and will make extensive improvements. The new models will be out by September 1.

## Railroads Clamor for Freight Raise

NEW YORK CITY, April 30—The railroads operating between New York and Chicago have decided to ask the Interstate Commerce Commission for an increase of freight rates. It is stated that the recent flood disaster, together with almost general wage increases, make such a step necessary.

## To Make Slide Valve Motor

CHICAGO, ILL., April 28—The Beller Slide Valve Motor Co., Chicago, has been incorporated for the purpose of manufacturing a non-poppet motor. With a capital of $20,000 the company will market a motor with sliding valves. The inventor is Esten B. Beeler. Facilities for the building of the engine are not yet at hand but it is expected that a factory site will be selected shortly.

## Automobile Securities Quotations

As a result of very weak trading there was a general decline in market values during the past week. But six quotations showed any gain at the end of the week and the greatest gain made by any of these was two points. Maxwell first preferred and Goodyear Rubber each fell off 20 points.

| | 1912 Bid | 1912 Asked | 1913 Bid | 1913 Asked |
|---|---|---|---|---|
| Ajax-Grieb Rubber Co., com | .. | .. | 150 | 160 |
| Ajax-Grieb Rubber Co., pfd | .. | .. | 94 | 98 |
| Aluminum Castings, pfd | .. | .. | 98 | 100 |
| American Locomotive Co., com | 44 | 44½ | 34 | 35 |
| American Locomotive Co., pfd | 108½ | 109½ | 102½ | 103½ |
| Chalmers Motor Company, com | .. | .. | 126 | 133 |
| Chalmers Motor Company, pfd | .. | .. | 98 | 102 |
| Consolidated Rubber Tire Co., com | 11 | 20 | 15 | 18 |
| Consolidated Rubber Tire Co., pfd | 20 | 40 | 60 | 75 |
| Firestone Tire & Rubber Co., com | 258 | 262 | 260 | 266 |
| Firestone Tire & Rubber Co., pfd | 108 | 110 | 104 | 106 |
| Fisk Rubber Company, com | .. | .. | .. | .. |
| Fisk Rubber Company, pfd | .. | .. | .. | 100 |
| Garford Company, preferred | .. | .. | 99 | 100½ |
| General Motors Company, com | 35 | 36 | 26¾ | 29 |
| General Motors Company, pfd | 73½ | 74½ | 70 | 74 |
| B. F. Goodrich Company, com | .. | .. | 30 | 31 |
| B. F. Goodrich Company, pfd | .. | .. | 94 | 97 |
| Goodyear Tire & Rubber Co., com | 238 | 242 | 310 | 322 |
| Goodyear Tire & Rubber Co., pfd | 108 | 110 | 100 | 101¼ |
| Hayes Manufacturing Company | .. | .. | .. | 90 |
| International Motor Co., com | .. | .. | 5 | 10 |
| International Motor Co., pfd | .. | .. | 20 | 40 |
| Lozier Motor Company | .. | .. | .. | 20 |
| Maxwell Motor Co., com | .. | .. | 3 | 5 |
| Maxwell Motor Co., 1st pfd | .. | .. | 40 | 50 |
| Maxwell Motor Co., 2nd pfd | .. | .. | 12 | 16 |
| Miller Rubber Company | .. | .. | 155 | 160 |
| Packard Motor Company | 104 | 107 | 98 | 102 |
| Peerless Motor Company, com | .. | .. | 35 | 45 |
| Peerless Motor Company, pfd | .. | .. | 95 | 100 |
| Pope Manufacturing Company, com | 35 | 38 | 16 | 20 |
| Pope Manufacturing Company, pfd | 75 | 78 | 52 | 56 |
| Portage Rubber Co., com | .. | .. | 35 | 41 |
| Portage Rubber Co., pfd | .. | .. | 85 | 90 |
| Reo Motor Truck Company | 8 | 10 | 11¾ | 12½ |
| Reo Motor Car Company | 23 | 25 | 20¾ | 21¼ |
| Rubber Goods Mfg. Co., pfd | 100 | 105 | 100 | 105 |
| Studebaker Company, com | .. | .. | 27½ | 29 |
| Studebaker Company, pfd | .. | .. | 88 | 90 |
| Swinehart Tire Company | .. | .. | 84 | 87 |
| U. S. Rubber Co., com | 60 | 60½ | 60 | 61 |
| U. S. Rubber Co., 1st pfd | 114 | 114½ | 103½ | 104 |
| White Company, preferred | .. | .. | 107 | 109 |
| Willys-Overland Co., com | .. | .. | 57 | 62 |
| Willys-Overland Co., pfd | .. | .. | 90 | 97 |

# Clark Co. Factory Is Sold

## Interests Represented by Maurice Wolf of Chicago Purchase Personal Property for Appraised Value of $11,219

### Real Estate Is Taken at Appraised Value by the Citizens' Industrial Club, which Held a Lien Against It for $26,000

SHELBYVILLE, IND., April 28—Interests headed by Maurice Wolf, of Chicago, have bought the plant of the Clark Motor Car Co., at Shelbyville, Ind., subject to the approval of the court. The sale was made by Herbert C. Jones, receiver for the company. The personal property was sold for the appraised value of $11,219, while the real estate will be taken at appraised value by the Citizens' Industrial Club, which held a lien against it for $26,000. Mr. Wolf will organize a new company which will continue the manufacture of the Clark car in Shelbyville.

## Appraise Schacht Company Plant

CINCINNATI, O., April 28—The Schacht Motor Car Co., which went into receivership a week ago is being appraised under the order of the court which as soon as completed will be filed in the court files for the inspection of all who are interested. All creditors have been requested to furnish statements of their accounts.

It now develops that practically all of the stockholders and 85 per cent. of the creditors joined in the receivership proceedings. The corporation has assets of the book value of approximately $600,000 and it is stated that the total liabilities will not exceed $175,000. It is expected that all creditors will be paid off in full and leave a good margin for stockholders, even in the event it becomes necessary to wind up the affairs of the company which course is not definitely decided upon as yet. For the meantime the business will be continued under direction of Receiver J. F. Deitz, who will make all efforts to pay off the indebtedness and get the affairs back into sound shape.

## To Sell Bergdoll Company's Factory

PHILADELPHIA, PA., April 28—The plant of the Louis J. Bergdoll Motor Car Co., at the corner of Sixteenth and Callowhill streets, this city, will be sold, together with its contents, at receiver in bankruptcy's sale on May 14 and 15.

On March 17 three creditors of the concern instituted proceedings in the United States District Court to have the concern adjudged an involuntary bankrupt. The creditors who petitioned the court and their claims were as follows: W. C. Rhodes, Inc., $1,696.85; Chilton Co., $505; and the Castle Lamp Co., $1,772.85. It is alleged that just previous to that date the Bergdoll company had made preferential payments amounting in the aggregate to over $33,000 to Erwin R. Bergdoll, C. A. Bergdoll Coal Co. and the North Broad Street Realty Co. This action by the three creditors has resulted in the bankruptcy sale.

## Creditors May Buy Columbus Buggy Co.

COLUMBUS, O., April 28—Considerable interest has developed in the coming sale of the property of the Columbus Buggy Co., Columbus, O., which has been set for May 14. The committee of creditors which has been working on a plan to buy in the property has not yet secured the required number of agreements to carry out the plan, although approvals are coming in daily. It is believed by members of the committee that sufficient agreements will be in by the time of the sale to permit the committee to carry out the plan proposed. Inquiries concerning the earnings of the company show that most of the prospective purchasers want to use the plant for the manufacture of electric automobiles almost exclusively.

NEW YORK CITY, April 30—The movement to organize a national association of motor car dealers is gaining headway. Fifteen or twenty trade associations in the East are expected to send representatives to this city for a meeting the end of the week when the possibility of such an organization will be gone into and the matter definitely decided whether a call will be issued for a national convention to be held at Indianapolis May 29 for the purpose of perfecting such an organization.

## Public Service Corp.'s Welfare Scheme

NEW YORK CITY, April 30—The Public Service Corp. of New Jersey is putting into practice an employees' insurance and sick benefit plan, designed along the following lines: The sum of $300 becomes payable to relatives, dependents or beneficiaries of deceased employees of the Public Service Corp. or any of its allied companies, if a man has been in the company's employment since January 1, 1911. If no such beneficiaries are known, the employee will be buried at the expense of the company not exceeding $75. In the case of sickness of employees who receive from $365 to $1,800 a year, the sum of $1 for each day including Sunday, during the first week of absence will be paid. If the wage is less than $7 a week, the benefit is limited to that weekly wage. The sick benefits during 1 year are limited in every case to $90. This arrangement only refers to regular employees of the corporation and its allied companies.

## Studebaker Profit-Sharing Plan

SOUTH BEND, IND., April 26—The Studebaker Corp. has decided to introduce a profit-sharing plan among its salaried department managers, assistant managers, superintendents and foremen. After all dividends have been paid, a part of the remaining net profits will be set aside for the profit-sharing fund and Studebaker stock will be bought for it at market prices. After 3 years, the stock will be distributed among the employees who have been employed by the company during that time.

## Market Changes of the Week

The most important changes of this week's markets occurred in copper and tin. Electrolytic copper declined $.00 1-10 per pound while tin rose $.25. The tin market was dull, though on Tuesday, little if any interest apparently being taken. Though the prices were quoted slightly higher, the buying was very inactive. The copper market was quiet, the buying being reduced to a minimum. Lead remained constant at $4.50. There was a good volume of trading reported. The petroleum products remained at last week's prices and continued firm, Pennsylvania at $2.50 per barrel and Kansas at $.88. Cottonseed oil experienced a decline of $.04, due to further weakness in the provision markets. No new developments arose in the scrap rubber market, automobile scrap remaining firm at $.10 per pound.

| Material | Wed. | Thurs. | Fri. | Sat. | Mon. | Tues. | Week's Change |
|---|---|---|---|---|---|---|---|
| Antimony, lb. | .07⅝ | .07⅝ | .07⅝ | .07⅝ | .07⅝ | .07⅝ | ..... |
| Beams & Channels, per 100 lbs. | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | ..... |
| Bessemer Steel, ton | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | ..... |
| Copper, Elec., lb. | .15⅝ | .15⅝ | .15⅝ | .15⅝ | .15½ | .15½ | —.00 1/10 |
| Copper, Lake, lb. | .15⅝ | .15⅝ | .15⅝ | .15⅝ | .15⅝ | .15⅝ | ..... |
| Cottonseed Oil, bbl. | 7.04 | 7.07 | 7.00 | 7.00 | 6.99 | 7.00 | —.04 |
| Cyanide Potash, lb. | .19 | .19 | .19 | .19 | .19 | .19 | ..... |
| Fish Oil, Menhaden, Brown. | .33 | .33 | .33 | .33 | .33 | .33 | ..... |
| Gasoline, Auto, 200 gals. | .22¼ | .22¼ | .22¼ | .22¼ | .22¼ | .22¼ | ..... |
| Lard Oil, prime. | .95 | .95 | .95 | .95 | .95 | .95 | ..... |
| Lead, 100 lbs. | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | ..... |
| Linseed Oil. | .48 | .48 | .48 | .48 | .48 | .49 | ..... |
| Open-Hearth Steel, ton | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | ..... |
| Petroleum, bbl., Kansas crude. | .88 | .88 | .88 | .88 | .88 | .88 | ..... |
| Petroleum, bbl., Pa. crude. | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | ..... |
| Rapeseed Oil, refined | .68 | .68 | .68 | .68 | .68 | .68 | ..... |
| Silk, raw Italy | ... | 4.35 | .... | .... | 4.35 | 4.35 | ..... |
| Silk, raw Japan | .... | 3.75 | .... | .... | 3.72½ | 3.82½ | +.07½ |
| Sulphuric Acid, 60 Baume. | .90 | .90 | .90 | .90 | .90 | .90 | ..... |
| Tin, 100 lb. | 49.50 | 49.50 | 49.63 | 49.61 | 49.60 | 49.75 | +.25 |
| Tire Scrap. | .10 | .10 | .10 | .10 | .10 | .10 | ..... |

# A.C.A. To Test Packard Motor 200 Hours

NEW YORK CITY, April 28—A 200-hour motor test on a 1913 six-cylinder Packard motor is to be made at the testing laboratory of the Automobile Club of America in this city some time between May 1 and 5. The test has already been arranged for by the Packard Motor Co., of Detroit, but it will be conducted by the testing corps of the club laboratory under the direction of Herbert Chase, laboratory engineer. The motor will be run on a block for this time and probably 300 hours with the throttle wide open and operating at a constant speed of 1200 revolutions per minute. The power output will be measured by the club's electrical dynamometer and records will be taken of fuel and oil consumed together with other data.

The real object of the test will be to demonstrate the durability of Packard motors under prolonged and exacting service and it is proposed to show the material and workmanship of these motors. Visitors will be admitted to the laboratory at any time during the test by securing a pass from the laboratory office. At the conclusion of the test full reports will be published.

## Will Be a Record-Making Test

This test if successful will be the longest official performance of its kind ever recorded in this country, if not in the world, and will exceed in duration the test of the Knight sleeve motor made by the Royal Automobile Club of Great Britain in 1909. The test will continue day and night without interruption, the motor being under the constant supervision of the laboratory staff working the three 8-hour shifts.

Rules covering the test have been drafted, and some excerpts from these follow:

RULE No. 4—If the entrant or technical committee shall order an interruption of the run because of actual or impending failure or breakage of a vital part of the motor, the test shall be considered incomplete and the facts, together with the reason for the stop, shall be fully stated in the report and certificate. The entrant may elect to begin the test anew after effecting repairs or adjustments. The total number of hours running in an interrupted test shall not be considered as equivalent to an equal period of uninterrupted running.

RULE No. 6—No control device which is not a standard equipment of the motor shall be used in the test, except with the approval of the committee. During the test those controls which are operated by the driver from the seat may be used.

RULE No. 8—In no case shall the piston speed be less than 1,000 feet per minute nor the power less than 70 per cent. of the maximum which the motor is capable of developing.

RULE No. 9—The following tests shall be required in the order named: Test A—Wide throttle runs. A series of short runs with wide-open throttle and of sufficient duration to determine the maximum power the motor is capable of developing. The speed at which this maximum power is developed shall be known as speed M in revolutions per minute. Test B—Non-stop run. A continuous run of not less than 100 hours duration at a speed selected by the entrant, but which shall not be above the speed of maximum power M or below a 1,000 feet per minute piston speed.

RULE 10—During the run the following observations shall be recorded: Air consumption of motor; rate of flow of water through jackets; section in inlet manifold; temperature of air entering carbureter, mixture leaving carbureter, exhaust leaving manifold, water entering and leaving carbureter jacket and gasoline entering the carbureter. Observations of the atmospheric conditions with respect to the barometric measure and humidity shall be made at intervals of not less than 2 hours during test speed. The specific gravity of the fuel used shall be taken each time the supply in the weighing tank is renewed.

RULE 11—The fuel will be supplied by the committee but lubricating oil by the entrant. The report will show the nature and quality of both.

RULE 12—The temperature of the water entering the cooling system of the motor shall not be less than 120 degrees Fahrenheit. A draft of air may be used to cool the motor or any portion thereof when necessary.

RULE 13—Following the dynamometer tests the committee will upon application of the entrant, conduct such road test as will demonstrate the performance of the motor in the chassis under a wide range of conditions.

RULE 3—The entrant shall, prior to the test, specify the length of the endurance run when the motor is to run longer than the minimum required under rule 9. He may elect while the test is in progress to continue it without stop for any longer period, but shall in this case give written notice more than 8 hours previous to the end of the run being made.

RULE 5—Ample time prior to the official test will be allowed for preliminary runs to make necessary adjustments. No adjustments of the motor or its accessories which directly affect the quantities being measured will be permitted after the first official test run has been started except as provided in rule 9. This rule shall not be construed as covering adjustments classified under rule 6.

## Peerless Announces Three 1914 Sixes

CLEVELAND, O., April 28—The Peerless Motor Car Co. has announced its new models for the coming season, which are three, all sixes, and listed 38-six, 48-six and 60-six. All are alike in design. Several improvements are included: Gasoline tanks are carried under the chassis rear and give a lower center of gravity. Springs are made with thinner leaves and more of them than formerly. Shock-absorbers are fitted front and rear.

The motor improvements include lighter pistons, using three rings instead of two. The practice of using T-head cylinders in pairs, with exposed valve parts, is continued. Semi-steel spiral gears are used for driving the camshaft, magneto and water pump. There is a universal joint between the clutch and gearbox which takes the place of the former flexible coupling.

All three models are listed with complete equipment, including power-driven tire pump, electric starting and lighting. The body designs are similar to those of this year, with all metal parts finished in nickel instead of brass.

The other general features of design are continued, namely, four-speed gearbox, arched rear axle, etc. Right-hand steering is used. Firestone demountable rims are stock equipment, and there is a tire bracket on the rear for supporting the two additional rims with tires.

SYRACUSE, N. Y., April 29—A full line of closed bodies will appear on the Franklin little six chassis next fall. There will be a limousine seating four inside, a berline seating four inside, a sedan seating five people and a coupé seating three.

## Is Now Tarrytown Motor Car Co., Inc.

TARRYTOWN, N. Y., April 29—Owing to the recent strict interpretation by the New York state authorities regarding inclusion in corporate names of words not in the English language, the application by organizers for a charter for The Motokart Co., Tarrytown, N. Y., has been refused, the new concern therefore being incorporated as the Tarrytown Motor Car Co., Inc. It will retain, however, the word Motokart as its trade mark.

NEW YORK CITY, April 29—E. H. Broadwell, who recently resigned the vice-presidency of the Hudson Motor Car Co., Detroit, Mich., has assumed the vice-presidency of the Fisk Rubber Co., New York City, with whom he was for years associated before going to the Hudson. His headquarters will be at Chicopee Falls, Mass.

## Prest-O-Lite Refillers Fined

NEW YORK CITY, April 28—It is illegal to fill a Prest-O-Lite gas tank with any but Prest-O-Lite gas, according to a decision rendered here in the Municipal Court today against two dealers who had filled such tanks with Searchlight gas and had been sued by the Prest-O-Lite Co. for alleged violation of the trademark section of the New York business law. Justice Spiegelberg, who rendered the decision against the defendants, Smith-Haines and Norman Brickner, based his opinion on the statute of the law forbidding the refilling of receptacles which bear trade marks, making each violation punishable to the extent of $100. This penalty was imposed upon each of the defendants. Louis Lande, their attorney, has entered an appeal against the decision and the case will be heard in the Appellate Term of the Supreme Court on June 2. Winter & Winter represent the Prest-O-Lite Co.

# Three Isottas for Indianapolis Race

INDIANAPOLIS, IND.. April 30—Although the entry lists will not close till Thursday, May 1, there are twenty-two cars entered in the third annual 500-mile International Sweepstakes race which will be held at the Indianapolis Motor Speedway May 30. This is eight more cars than were entered at this time last year when the contest was such a great success.

The latest entries to be received are three 36-horsepower (S. A. E.) Isotta-Fraschini cars. The Isotta-Fraschini Motors Co., New York City, states that two of these machines will positively appear in the race and will be driven by Teddy Tetzlaff and Harry Grant. The third machine entered will also probably appear on the course with either Gilhooley or Trucco, from the Isotta factory, at the wheel. The entrant of the first car is William Ziegler, Jr., while the second racer is entered by E. E. Hewlett, of Los Angeles and G. M. Heckscher, of New York City, its joint owners.

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PARIS, FRANCE, April 23—Booked to sail from Havre Saturday, May 10, on the French liner La Provence, Albert Guyot and his mechanician Grossmann, will doubtless reach Indianapolis with the six-cylinder Sunbeam racer, about May 19. The Sunbeam racer, which has been tuned up by Guyot on Brooklands track, is being crated to be shipped to New York via Liverpool. It will reach America a few days ahead of the driver, thus being ready to be put at once on the fast train for Indianapolis. Guyot counts on having 10 clear days during which to carefully tune up the car on the Indianapolis Speedway. Immediately after the race it is the intention of Guyot to return to Paris, for he is under a contract to drive for Delage, in the French Grand Prix. It is quite possible, however, that the Sunbeam racer will remain in America and that Guyot will come back toward the end of July in order to take part in other American races.

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LONDON, ENGLAND, April 18—Fast time was made when two wheels were changed at the time of the recent Peugeot record exhibition. At the end of the first hour the car stopped for 35 minutes, during which two Rudge-Whitworth wire wheels were replaced with the car jacked up. This space also included the substitution of Boillot for Goux as driver.

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## English to Hold Benzol Contest

LONDON, ENG., April 24—In view of the fuel problem the announcement that the Brooklands Automobile Racing Club are to run off a race for cars running exclusively on benzol is extremely interesting, while the first prize of $500 and $250 and $100 for second and third prizes are to be presented by the Royal Automobile Club, the Society of Motor Manufacturers and Traders and the Automobile Association and Motor Union respectively, is also arousing interest as these bodies are at present investigating the possibilities of alternative fuels to petrol. No effort is to be spared to make the event thoroughly representative, and to draw the attention of the public to an alternative fuel that at the present time is available only in limited quantities. Not only is benzol to be supplied to competitors free of charge for the race, but also free of charge for the purpose of practice. Not more than twelve cars will be able to compete, and a special cup is to be presented to the entrant of the car which, having also competed in the 100 miles an hour race for cars running gasoline, accomplishes in the benzol speed test for a flying lap of the track a speed that will compare with its highest speed lap in the race for gasoline cars. The race is to be included in the program of the Brooklands Whitsun meeting, so that there will be a very attractive program with this event figuring as the principal and the usual handicaps, and from the main event one will be able to form some idea as to whether better speeds are to be obtained by running on benzol than on gasoline.

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## Grand Prize Conditions Announced

NEW YORK CITY, April 28—The Automobile Club of America has given out information relating to the conditions under which this year's—the fifth annual—Grand Prize run will be carried out. The race will be over the Savannah course, 11.44 miles long, so that thirty-five laps will give a total run of 400.4 miles. Outside of the Grand Prize trophy there will be four money prizes, amounting to $3,500, $2,000, $1,000 and $500 respectively.

Each car entered in the race must have a reverse gear driven by the motor, an exhaust outlet not directed toward the ground and an overall length not exceeding 146 inches. The cars will be started according to their order of entries.

The entry fees are as follows: A single care of one make, $1,000; a two-car team, the cars being of one make, $1,500; three cars of the same make, $1,750.

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## Oldfield Makes Record Mile

NEW YORK CITY, April 28—News was received here today that Barney Oldfield yesterday broke the world's record for the mile made on a 1-mile dirt track by making the distance in 46 2-5. The feat was accomplished at Bakersfield, Cal., on the new $100,000 race track during a sanctioned meeting. The previous record time was 47.85, made by Bob Burman in the 300-horsepower Benz on the Brighton Beach track on September 7, 1912.

The mile was timed by an electrical device, but the latter will have to be submitted to the A. A. A. and tested to their contentment, before the time made by Oldfield's bill will be recognized as an official world's record.

Tetzlaff in the Fiat went 5 miles in 4:22 2-5. The 25-mile free-for-all for $2,000 cash prize was won by Tetzlaff in a 120-horsepower Fiat in 23:38. Cooper, in Stutz, second, and Hill, in Fiat, third. Ten-mile race won by Nikrent in Buick.

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## Hope for Another Fairmount Race

PHILADELPHIA, PA., April 26—There is a possibility of the resumption of the Fairmount Park road race. A committee from the Quaker City Motor Club waited on Mayor Blankenburg yesterday and urged him to reconsider his opposition to the event and to recommend to the Fairmount Park Commissioners that permission to use the park course be granted for the purpose of conducting a 200-mile road race under the same rules and regulations as governed the chassis in the past. Mr. Blankenburg said that while he would not stand sponsor for the race nor accept any responsibility in connection therewith, if the Councils were to pass a resolution requesting the Park Commission to grant the Quaker City Motor Club the necessary permission he would not oppose it. Accordingly, Common Councilman Hardart will introduce such a resolution at the next meeting of the City Councils.

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NEW YORK CITY, April 30—The first automobile contest to be held this year by the Motor Dealers' Contest Association will take place Friday, May 2, and will be a secret time run. Both gasoline and electric cars will compete for the prizes offered to those running nearest to the secret time.

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PHILADELPHIA, PA., *April* 26—Thirty-three entries have been received so far for the sixth annual sociability run of the Quaker City Motor Club next Saturday to Atlantic City, N. J. The run, which is a fixture of the organization, will be a secret time schedule event, four prizes being awarded the four contestants finishing nearest a time secured by adding all contestants' guesses together and dividing the total by the number of estimates. Independently of the prizes a silver tie clasp, on which is the club's insignia, will be given each entrant.

The Automobile

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# Sample Salesmanship

HERE is an example of how a business man sometimes views the salesman who tries to contort matters and give the impression that his product is the panacea of the industry. Ostrich-like salesmanship is the poorest kind. It occupied a place a few years ago when salesmanship did not exist, but when the so-called salesman was merely a billing clerk for orders. Here is the example, and for every one of these, where the would-be victim takes the trouble to write his experience, there are thousands that pass unheard.

"Yesterday an agent for the —— shock-absorber, one of your advertisers, called on me for the purpose of selling me a set of his devices. Among other things he made the statement: 'They will save their price in tire wear in 2,000 miles of running.'

"A set of tires for my machine costs approximately $70 and is guaranteed to give 5,000 miles per tire. This makes tire cost .00125 cent per mile. If, therefore, the —— absorber devices saved 100 per cent. of tire wear, so that at the end of 2,000 miles running, the tires were as good as new, it would have saved $28. On the contrary, it would not do this and obviously would not save more than 25 to 50 per cent. of the wear at most.

"On the 25 per cent. basis this saving would amount to $7, and the device, which he agreed to sell me for $35, would save enough money to pay for itself in 28,000 miles of running.

"If my calculation is correct, either the salesman in question does not know his business or he deliberately tried to mislead me. In either event, I am offended at this kind of salesmanship."

THE AUTOMOBILE receives letters similar to this nearly every week, drawing attention to how the business man objects to the selling tactics of many salesmen. In view of this, it is to be regretted that the organization of salesmen formed last fall should not be carrying on an active campaign throughout the present season, which is one of the most acute in the selling field.

There is as much need for an organization of salesmen as there is for a society of automobile engineers, but their efforts must not all be centered in a scientific-salesmanship festival once a year, but must be distributed in workable rations, particularly over the acute selling period.

Such an organization could have an active executive committee which would issue monthly bulletins of the practical, get-down-to-business type, which bulletins would reach every dealer in the country, and who could place these arguments in the hands of his salesmen at times when they are working at the greatest capacity. By so doing you will gradually improve the caliber of the salesman. You will not do it on the "annual gorge" plan.

# Dealers To Organize

A REPRESENTATIVE of a business house not associated with the automobile industry, excepting through financial relations, recently made the statement that he considered the automobile dealers to be the poorest class of business men in the country. The percentage of failures in their ranks, he went on to say, was abnormally large, and further that a great majority of those at present doing business are not making money.

It is impossible for any line of business, not making a rational profit, to be in a healthy condition, and in the case of the dealers it would seem that the chief responsibility for their failure to make money rests on their poor business ability and poor organization.

Certain dealers have been selling gasoline at a profit of 4 cents a gallon and making money on it, whereas others handling the same fuel at 15 cents a gallon profit have not been making money. This one example proves the necessity for business acumen in the ranks of the dealers.

It is to be hoped that the new national organization of dealers which is being discussed at present will go through. There is need for it. Such an organization will put the dealers on a new plane if it does nothing more than teach them the rudiments of conducting a business. These dealers have to be taught how to handle forces of salesmen; how to conduct repair shops; how to conduct the accessory departments of their business; how to conduct the tire repair department; in a word, how to conduct each and all of their various departments.

Such a national organization has a legitimate field for existence, and those piloting its early life must see that it is launched on a sound financial basis and that the highest-caliber men are obtained to man it. Such an organization is purely a business institution. It is needed as much as the state and national organizations of the banking world. Such an organization must work every day in the year. It is not an organization of seasons but one with a task before it and its efforts will have to be diverted along a hundred channels.

# French Road Maintenance Costs $1 a Head

JEAN DE PULLIGNY, chief engineer of roads and bridges in France, made the statement before the recent Roads Convention of the A. A. A. in Washington that France is spending annually $1 a head for road maintenance.

France is about four times as large as the state of New York, its population is a little more than four times the state of New York, consequently with a population of New York state slightly over 9,000,000 in 1910, it means that this state would have an annual expenditure of $9,000,000 for road maintenance. This does not include road construction.

During 1912, twenty-nine of the states of the American Union expended $62,691,425 on the construction of roads. The total population of these states is 61,261,000 so that the expenditure in these states approximates practically $1 per head. Practically all of these states, however, were experiencing abnormal road expenditures, which expenditures will have to be continued for some years. But France spends her $1 per head on road maintenance, and these states have been spending $1 per head practically on road construction. Many of our states have not yet learned the lessons of road maintenance, but if it is on a par with that in France it will practically mean a sum equal to that used on construction.

The original cost of construction of French roads was $12,040 per mile for a hard macadam surface. Hard road construction, and the agitation for good roads in France began 150 years ago, and the beginning of the present network of French roads radiating from Paris dates from 100 years ago. Most of the roads in France, even the earliest, were of macadam construction.

France has to date 340,000 miles of roads, and in the last century has spent $1,300,000,000 on these. Of this amount $400,000 has been supplied by the central French government to the heads of the roads departments throughout the country extending over a period of 70 years, namely 1820 to 1890. Since 1890 the work has been going on at a slower pace with smaller appropriations, most of the useful work having been done prior to that date. This means that the central government of France during those 7 years appropriated $6,000,000 a year in the building of roads. During that time the appropriation for building smaller roads was approximately the same as that for maintaining the national highways. The French government is now expending $45,000,000 per annum for maintenance alone.

But there are other public roads which the central or federal government has nothing to do with, but which work is carried on in different departments. France has department roads and county roads. For some of these roads the money is taken in taxes which belong to the department; for some others it comes from taxes that belong to the county; and for some others from taxes that belong to the townships.

The deparment is divided into units called counties and over each county is a chief engineer. Each county is divided into judicial districts which has a district engineer. Free interchange of ideas takes place among the engineers, the county engineers are taken among the district engineers and the chief engineer is taken among the county engineers. Head over all is the prefect, a political man, who is not necessarily a practical man in road-building but who operates through his chief engineers in the various departments.

The district engineer has charge of the patrolmen who care for road maintenance. That engineer is going nearly all day riding or on foot or using a bicycle, or perhaps a motor car. Every day he goes to the villages, speaks to the people, consults with the mayors, and knows perfectly what the people desire. He knows where the money ought to be spent and is independent and has no reason to favor one any more than the other. In this way he estimates every year for the building of new roads and also for maintenance. He forwards the estimate to the engineer above him who knows the total of his district from such reports and in turn prepares such a scheme for his entire district and forwards it to the chief engineer of the department; and the chief engineer of the department in turn confers with the Prefect. From such reports is prepared a scheme for the complete building of new roads and for maintenance and this scheme is brought into the local legislature.

These departments are really the little states of France that have their own governments elected by the people, and it is these local parliaments that decide where the money shall be spent.

## Predicts a Great Demand for the Cyclecar in America

HARTFORD, CONN.—Editor THE AUTOMOBILE:—I have read with considerable interest your editorial in THE AUTOMOBILE for April 24, with reference to the cyclecar, and while I thoroughly agree with you with regard to the tremendous demand and the future of the cyclecar, our concern probably being the first to promote the cyclecar in this country, I want to take exception to that part of your editorial which states, "there is no demand for the three-wheel car," in proof of which I want to say that over a year ago we were unable to fill approximately 3,000 orders which we had on our books for these cars. Since this time the demand for our cars has greatly increased, and while we are great believers in advertising, and the first demand for our car was undoubtedly created by the advertising which we had done, for the last year we have not spent 1 cent in advertising, and yet we have orders on our books today for fully 4 months ahead and every one of these orders has come in to us without solicitation further than answering correspondence, sending out catalogues and literature.

There is a demand all over the United States for cyclecars, either of the construction of the Motorette or other cars as described in your article and this demand is enormous.

We know what we are talking about in this particular. We have been building Motorettes for 3 years and have had ample time to judge the public pulse. It has been my experience that automobile dealers throughout the country do not want to handle three-wheel machines, and that their feelings against them are not due to any real market conditions, but to the fact that there is a lot of pride connected with an automobile dealer, and that he is inclined to believe that the other dealers will make fun of him; but in spite of this the demand exists. The general public wants something along cyclecar lines and it does not care whether it has three wheels or four so long as it is reliable, durable and neat in appearance.

There is a tremendous demand for any reliable cyclecar, which will stand up under American road conditions and which will be easy-riding at the same time.

While we are not given to predicting, we believe that within the next 2 to 3 years there will be built in the United States more cyclecars and cars of the Motorette type than all the other cars put together.

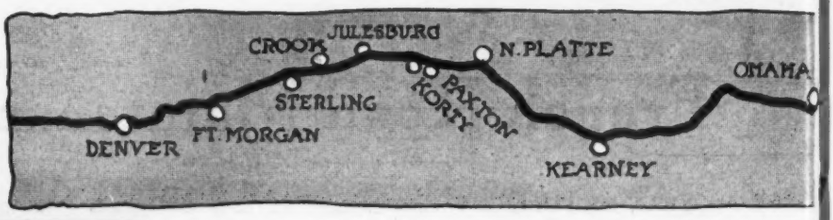
We believed this condition was coming 3 years ago when we first put ours on the market.—C. W. KELSEY, Kelsey Motor Co.

*Top—Well-graded and slightly crowned, this road, near Marshalltown, Ia., has its surface maintained by dragging after each rain. Its one fault is that the side growth of weeds and grass should have occasional right-angle gutters that the surface water may flow to the shallow ditches on each side indicated by the arrows.*

*Upper Middle—A road between Omaha and Central City, Neb., that was well graded, crowned and side-ditched when laid out for improvement. Lack of attention in the meantime has allowed vegetation to encroach on the sides and the crown to become flattened from traffic. Horizontal line shows flattened crown with side slopes.*

*Lower Middle—Traffic alone defines the traveled way from the fields by cutting two deep ruts in the deep sand. The landowners along the way hope the county authorities will haul in clay (gumbo) and spread it as a blanket 4 inches deep on top the sand. This will give a treacherous road when wet, merely going from one evil to another. By thoroughly mixing the two with a disk harrow then crowning and rolling and side-draining there would be an excellent road as the result. There are 6 miles of this road between Silver Creek and Central City, Neb. The arrow indicates a deep ditch which leads nowhere.*

*Bottom—Almost bottomless is this sand. The traveled way changes its surface conditions with each rain. The county authorities have promised to some day fix this stretch at Valley, Neb., by claying it 3 or 4 inches deep. In the meantime all traffic struggles through as best it can. The arrow indicates a soft spot.*




# A Transcontinen

By Ernest L. Ferguson

## Covering 650 Miles from Omaha to Denver, Constituting the Second Stage

FROM Omaha to Denver is 650 miles. This is the second stage of the 2,600 miles of the transcontinental route between Chicago and the California line. Last week the Chicago-Omaha leg was taken up; next week the Denver-Salt Lake City division will be handled, and the following week Salt Lake City to the California state line.

Omaha to Denver is a river-level route, in that the Platt river and its southern branch are followed or paralelled for practically 90 per cent. of the 650 miles. You are not close to the river side, often several miles distant, but always traveling on approximately the water-level elevation.

This leg of the trip is made up of two types of roads: The first half is a sandy one with the exception of a few miles between Omaha and Fremont. It extends nearly to Julesburg, Col. The second half, Julesburg to Denver, is on an alkaline soil, which makes heavy going when wet.

The first half of this trip is really a virgin sand road. To improve it will need mixing a clay or gumbo with the sand. In local sections this is being started.

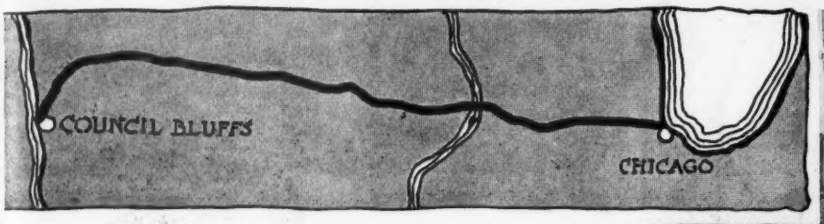
### The Irrigation Territory

From Julesburg to Denver embraces the irrigation territory, and the people have found it necessary to have good roads in order to get their goods to the beet sugar factories. Consequently, these alkali roads are better looked after than the sandy first half.

The entire route between Omaha and Denver is sign-posted, thanks to the enterprise of the Platte Valley Transcontinental Good Roads Association, which is also doing much to improve the road.

Of the 650 miles 200 miles may be designated bad roads in case of abnormal rains, which would wash the sand. An ordinary day's rain will not have any effect upon it. In the irrigated section a heavy rain means that you stop your trip for several hours, or perhaps a day, until the soil has dried.

Between the Missouri river and the Rocky mountains the transcontinentalist, in selecting the last leg of this section, is confronted with objective points of interest. Whether to include Denver in the trip or to push straight through via Cheyenne, Wyo., are the selective conditions. Assuming that a day or two extra time is not of moment in a 3,000 or 4,000-mile journey, one should by all means include Denver with its many sur-




# tal Hodge-Podge

Part II

## Of the Entire Stretch, 200 Miles of Road Are Bad in Case of Abnormal Rain

rounding scenic attractions. These will more than repay for the added time.

From Denver west the most traveled route swings to the north and then west. In this touring north a chance is had of keeping to the west of Cheyenne, direct to Loramie, or going via Cheyenne. This latter adds but 2 hours to the trip, and if one has dated the trip to be in that location during the annual fête of Pioneer Days at Cheyenne, then that town should certainly be included in the itinerary.

In touring west from Omaha the transcontinentalist has the choice of two routes. The one that has been most frequented is that following the old Overland Trail along the Platte river, historic with associations of the early fur traders, the Mormons, the Oregon pioneers, the Forty-niners, the pony express, the six-team coaches, and then by the first railroad across the continent. All of these were preceded by buffalos and Indians from time immemorial, making the line of travel for those who came after.

### First Route Logged

This route was the first west of the river to be logged in detail during the pathfinding for the annual tour of the American Automobile Association in 1910. The tour first brought it into prominence for automobiling. Since then there has been formed the Platte Valley Transcontinental Good Roads Association which is doing much to improve its conditions.

While the roads for most of the way will require a lot of work upon them, it is now very efficiently marked by a signal made up of a combination of white, black and yellow bands. White is used as the central color and above and below this is a band of black one-eighth the width of the white, then come the top and bottom bands of yellow that are one-third the width of the central white.

In following this route it is at Julesburg in the extreme northeast Colorado that occurs the dividing of the ways. Here the decision must be made whether to hurry on to the Pacific coast by branching off to the northwest across country and direct through Cheyenne, or whether to take in the more worth-while scenery around Denver by branching across country to the southwest. The layout is like a huge Y with the stem reaching from Omaha to Julesburg, the right-hand branch leading northwest and the left-hand leading southwest.

*Top—The half-way, coast-to-coast air line sign, measured in terms of miles and not in the matter of time, owing to the differences in the roads to the right—east, and to the left—west. It is 4 miles from Kearney, Neb.*

*Upper Middle—The Platte river has no banks, its boundaries are therefore undefined. For most of the year it is shallow, where it is not a series of sandy flats, and looks like a huge marsh. Four times the river is crossed on wood structures one-half mile in length and well kept as to condition. This bridge is crossed soon after leaving Gothenberg, Neb.*

*Lower Middle—This roadway between Ft. McPherson and North Platte, Neb., is so heavy with sand that even light buggies require two horses, and they never get out of a walk. It was once the bed of what is now the Platte river. Its only possible reasonable-cost betterment is to discover a clay bed fairly near that the two may be correctly mixed. There is probably one stretch of 8 miles. This is the type of road that surrounds the national soldiers' cemetery at Ft. McPherson. The truck is off the real roadway.*

*Bottom—Not a plowed field but the regular roadway. A nearby farmer had started to throw the side sod into one of the sand ruts in the effort to reduce strain on the horses and harness, but soon tired of his efforts. This is the approach to a dry creek bed that once was tributary to the Platte, one mile west of Paxton, Neb.*

Throughout the distance the greatest extremes are met in the matter of road surfaces. There will be found stretches of excellent stone or gravel roads that occur in clay sections of country and again in sandy sections. There are even such stretches that have clay at one end and sand at the other, so peculiar is the soil make-up along the way.

In many of the clay sections log dragging is done under the influence of the road association. In fair weather this gives delightful traveling, as is known to all who have had the experience. In wet weather there is the same objection that applies to all roads of gumbo or like soil. Skidding is ever present when the surface is thoroughly wet and during the first drying-out the road surface cakes into large masses that are thrown in all directions as the wheels revolve.

While there are many sandy stretches scattered along the way they are not of the impassable kind that gives no tractive effort at the rear wheels. In wet weather it packs well, and in the longest dry spells the most that occurs is the need for low gear for short distances.

## Claying the Road

Included in the road work that is being done along this route is the hauling of clay on to some of the sand lengths, claying the road as it is termed. This operation more generally takes place where most of the main traveled roadway is of clay consistency with intermediate sand stretches. The clay is laid on as a blanket.

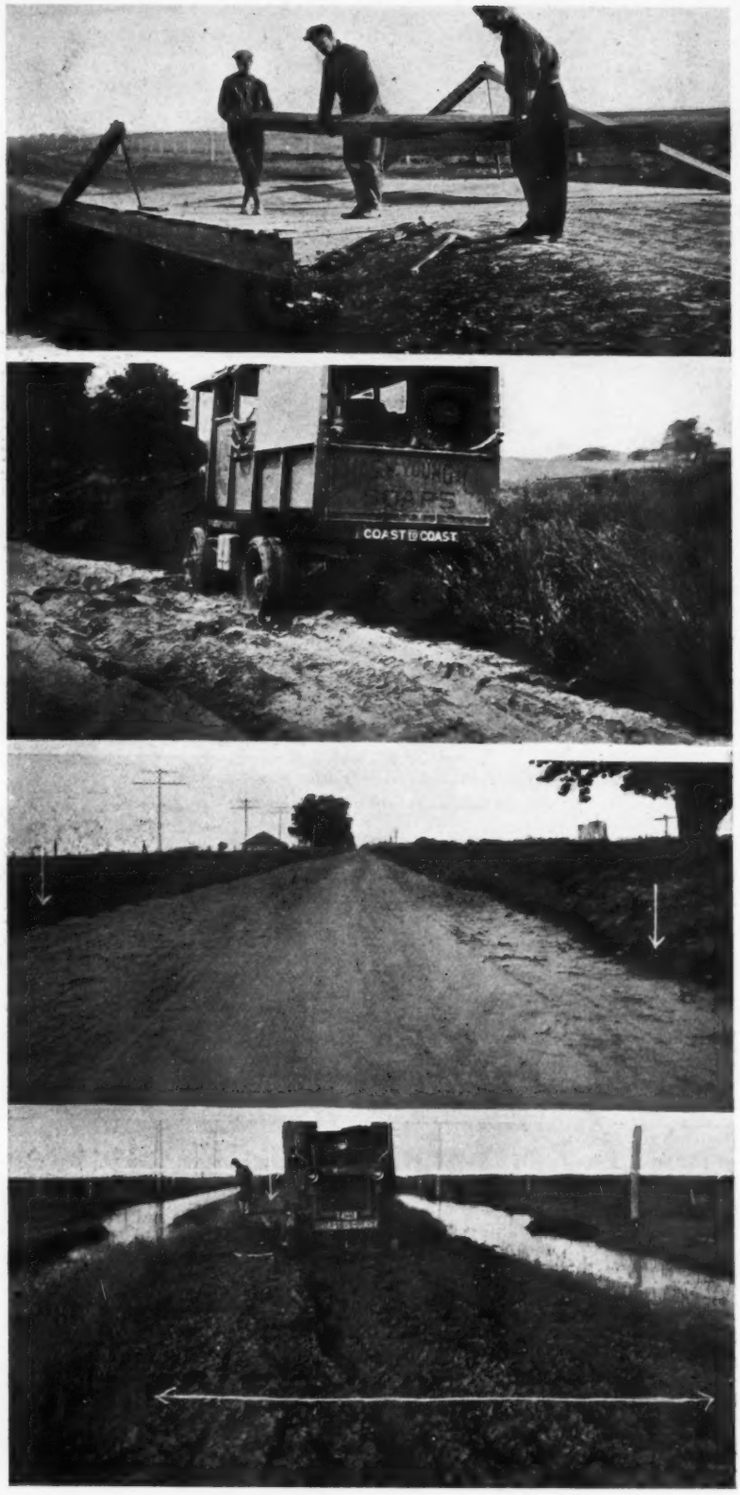
The objection to this method is that it brings about the evils of the natural clay road in wet weather during the first few rains. Later, under the peeling effect of traffic, because of the tendency of the clay to lift with the wheels, the roadway sinks back to its sandy condition. The main offset to this is the long continued dry periods that prevail in much of that territory.

The mixing of the sand and clay into a compound mass with previous grading and subsequent rolling is yet to be tried out at any point along the way. In fact, that too-often prevailing condition, road building as a by-product and not a defined industry, is prominent. Now and then, however, there are evidences of awakening. Some of the sand hills that were encountered by pioneer transcontinentalists have ceased to be a factor. The new lines of the roads go around the hills.

## Along Irrigation Channels

A condition in the western half of this portion of a transcontinental route has its paradoxical side. Irrigation is bringing about good roads; at the same time it now and then destroys their utility. Irrigation has brought about a settlement of vast tracts that were before considered not possible for cultivation. With this has come the needs for roads better than those remaining from the days of the old trail. In some districts serious efforts have been made to construct the roads that are at least graded and at times drained. Generally these parallel the irrigation channels.

Obviously to attain the flooding of the surrounding acreage the main and all sub-channels must carry the greater proportion of their waters at a level above the fields to be flooded. In their construction only shallow ditching is done, and the earth thus removed is piled along the sides to form the retaining banks, giving a dike formation as the general scheme. Much of this irrigation work has been hurriedly, evenly cheaply and, therefore, poorly done. As a consequence when there is a heavy rush of water through the important mains or feeders there are occasional breakages in the retain-

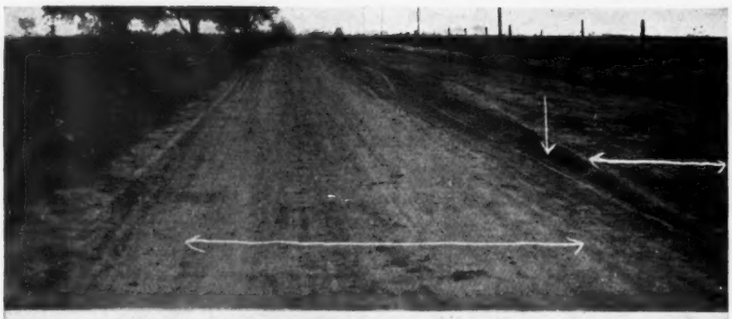



*Top—A sample of a tractor plow's havoc with an irrigation bridge 12 miles west of Julesburg. A number of trans-continental tourists had gone over the structure between the time of the plow's wrecking and the taking of this picture. They badly sagged the flooring on the torn-away side.*

*Upper Middle—Another sand stretch west of Julesburg that has been somewhat widened by traffic in the effort of trying to find a right-of-way that will give some sort of footing. Each vehicle, automobile or horse, tries a new line of travel as the sand is so light and shifting that it never packs down to even a defined rut-road condition.*

*Lower Middle—A newly dragged roadway in a recently settled irrigation district between Julesburg at Sterling, Col. The roadway is far enough away from the main irrigation channel to be free from destruction by breaking banks or overflows—a condition that has to be contended with in some sections of northeast Colorado. The arrows indicate ditches.*

*Bottom—A nearby main irrigation channel had broken through its earth banks at 1 mile west of Crook, Col., two weeks before and overflowed this low portion of a built-up road. The alkali soil of the road absorbed the water as readily as would a sponge making it nearly bottomless. Horizontal line indicates top of irrigation bank. Vertical arrow shows hard, smooth section water had not covered.*



*Top—This road between Sterling and Ft. Morgan, Col., had been made with a four-wheel road scraper. Traffic finally made a smooth driveway, but meandered about in a zig-zag course in finding the hardest and driest spots after some recent rains. Vertical arrow shows slight ridge and horizontal arrows unused part of road. There are 2 miles of this roadway.*

*Upper Middle—A newly settled irrigation project west of Ft. Morgan. The newcomers are progressive and are dragging the roadway with heavy beams to cut off the sage and other growth. Horizontal line indicates temporary roadway. There are 6 miles of this improvement to be made.*

*Lower Middle—Well maintained as to surface by frequent dragging. Its greatest fault is that insufficient side-ditching does not take care of the surface water coming off the high field-bank on the right. Arrow indicates ledge without sufficient ditch.*

*Bottom—Once a rocky defile, now a scenic canyon. The high bank of rock on the right has been blasted away and the resultant rock used to form a roadbed—with a fixed grade—raised above the rock-bottomed small stream on the left. This is Owl Canyon, north of Denver. The canyon is S-shaped and is 1 mile in length. Arrow shows lack of ditch.*

ing banks which yield under very slight strains. This means a flooding of the roadways, even those that have been graded sometimes suffering. Owing to the level character of the land such side drains as may be made as part of the roadway construction have little opportunity to carry away the flood waters. Time, from saturation and evaporation, must do the most in that direction.

This brings about, along those portions of roadway that are the lowest, stretches of more or less length that are heavy with sticky mud when all else is dry and good going. During 1910 and 1911 a large area in one district was without sufficient water supply in the irrigation project. This caused stagnation, and worse, in farming operations to hold back projected road improvement. Last year was one of successful crops, and there has been an overabundance of water in the irrigation channels. Those living in that country look forward to a renewal of road work in the present year. Much of this will be due to the fact that the settlers believe in the value of making it possible for automobiles to travel comfortably through their country and note its development without the distraction of contending with poor roads.

## The Culvert Problem

Another problem that has to do with irrigation is the construction of small bridges and culverts both large and small. The very scheme of irrigation requires them frequently at less than a mile apart. Much of this work shows the same hasty character that the diking displays. They rapidly deteriorate where travel is of any moment, but more than all there is a seeming lack of upkeep. This is apparently due to lack of proper supervision, and in some instances to there not being a definite understanding as to who is responsible, the irrigation company or the country. In a few instances a bridge or a culvert has been damaged by heavy tractor plows, or the like, and allowed to remain in that condition for months.

Not a little of the route is yet in its early trail condition. Sometimes there are no defined side lines, and again some side fencing may point the way where irrigation or dry farming settlements have been started. Frequently whatever prominence there is that travel goes that way—that is, distinct markings as against faint trails, at turns especially—is due to the automobile travel that is more and more becoming an important factor even in sparsely inhabited sections.

## Hope for the Future

While approaches to Denver from the east leave much to be desired at the present time, the situation is one that will not maintain for any great period of time. Colorado now has a state highway system that is working along fixed lines. To the north, south and west of Denver marked improvements have taken place since the commission has been in power. These highways lead to the surrounding scenic wonders in those geographical directions. The present layout and construction rather confines pleasurable touring to those within the boundaries of the improvement. However, the importance of supplying an approach for the automobile tourist from the east is well recognized and it will be a matter of only reasonable time until the present poor stretches are displaced by highways.

In the meantime the two most difficult spots that have heretofore bothered those entering the state at its eastern border have been cared for. These are two dry sand creeks between Fort Morgan and Denver. Over their beds have been laid concrete floorings.

*(To be continued)*

# The Engineering Digest

## A Digest of Technical Information from the Engineering Journals

*Attention of automobile engineers and manufacturers is called to the Bonecourt system of flameless surface-combustion by which gas and liquid hydrocarbon fuels may be converted into power with scarcely any waste of heat units, making steam far more economical as a power source—sometime in the future—than the internal-combustion motor, even on the Diesel plan. Flash and semi-flash generators apparently not out of the question.*

*Some remarks on double ignition for low-speed motors—and something on deceptive car and motor noises.*

—

**FLAMELESS Combustion and Automobiles of the Future.**—While the mechanical perfection attained in well-made automobiles is turning popular attention toward the delicate fuel question and is centering the interest of the industry in improved methods for lowering the cost of producing these high mechanical qualities heretofore secured in too-high degree by painstaking fitting depending upon manual skill, rather than by foresighted and comprehensive engineering of the highest order, new discoveries in thermo-engineering—if such a term is permissible—are already gaining a practical foothold in which there is discernible a steady advance against the supremacy of the internal-combustion engine in all of its applications, including eventually the automobile motor. Although it may require a series of years before anything can be produced on the basis of the new discoveries which will equal the automobile motor in reliability and compactness, the same may be said of the many efforts now actually under way for perfecting aviation motors and for adapting the gasoline motor to the use of kerosene or heavy oils as fuel. Flameless combustion under the "Bonecourt" process, though at present steered toward other more immediately apparent industrial objects, fixes upon the horoscope of the automobile movement an obvious possibility of a widespread return to steam power in the form of a small flameless oil-fed boiler-generator working with a diminutive turbine engine, somewhat of the Wittig type (quite widely used in Germany), with a simple oil-separator, a ventilated condenser and preheating of the air needed for combustion.

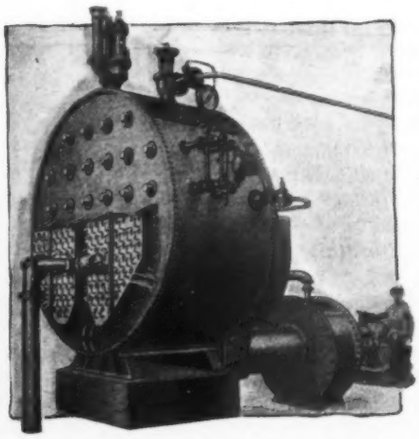


**Fig. 3—Experimental 500-hp. flameless surface-combustion steam boiler tried in England and Germany. First type tried**

Flameless combustion is at present in the hands of powerful corporations in England and Germany and is under the substantial wings of the Standard Oil Company in this country. It is scheduled for extensive trial in special locomotives to be built—or perhaps already under construction—for the New York Central railway company.

Scientific information on the nature of the discovery is given in *Engineering* of May 10, 1912, page 632, and in *Feuerungstechnik* of January 1, 1913, page 118.

It suggests closely the processes of slow flameless combustion taking place in the respiratory organs, the lungs of animals and humans, and has long been foreshadowed in the phenomenon known as catalytic incandescence caused in spongy platinum when a hydrocarbon gas is brought in contact with the air contained in the pores of this substance—a phenomenon which was turned to account for ignition purposes in some early automobiles in France and the principle of which has been applied to cigar-lighters, repeatedly though not very practically, during the past fifty years and perhaps earlier. Flame-retaining wire screens and Welsbach gas mantles also afford parallels for comparison, so that the invention may be considered a natural upshot of contemporary knowledge.

That any danger which flameless combustion involves for a conservative development of the automobile motor means a new chance for greater efficiency and economy in the manufacture and utilization of automobiles, and therefore for further expansion of the automobile movement and of the industry which caters to it, is perhaps self-evident. And to what extent the discovery and the inventions already clustering around it may be entitled to the attention of automobile engineers and inventors, with a view to applying the new methods to road vehicles, and establishing a competing variety of the latter, will appear from a presentation of the subject in the *Zeitschrift des Vereines Deutscher Ingenieure* (Journal of the Society of German Engineers), of February 22, from the pen of Richard Blum, a director of the German corporation which has the industrial development of the matter in hand for German-speaking countries. While nothing is said in this article, which was first delivered as a lecture before engineers in Berlin, of any application to automobile purposes, those familiar with automobile requirements can readily draw interesting inferences from the facts presented and may even form a provisional idea on the important question relating to the amount and weight of the materials which it would be necessary to incorporate in a flameless combustion power plant for an automobile or motor truck of a given power. The most telling passages and illustrations of this articles are reproduced in the following.

—

To burn gas completely in an ordinary gas burner, about twice as much air is required in practice as theory demands. As the extra air must be heated in the flame, and as the air drawn into the flame from the sides also has a cooling effect, the temperatures developed fall far short of the theoretical heating value of the fuel used. If the gas pressure is increased till the speed of the flow exceeds the relatively low speed of backward flame propagation, the flame becomes detached from the burner nozzle and is soon extinguished by the afflux of air behind it. The flame is also cooled by its relatively cold surroundings.

In order to get better results from high pressure and speed of the gas mixture, a different burner must be used. If the end of the feed pipe of the burner is surrounded with granulated highly fireproof materials, and the gas mixture is now sent in under a pressure which would at once extinguish an ordinary burner, the effect is surprising. The fire-proof mass becomes first red-hot, then incandescent. A lively combustion consequently takes place in the interior of the mass. The explanation

lies in the larger combustion-zone afforded for a given amount of gas mixture, in the exclusion of cold air from the sides, and in the preheating from the interior of the fireproof material of those surface portions of this material where the true combustion, during continued operation, is found to take place.

The most surprising fact in connection with this surface-combustion is, however, that the amount of air required for effecting it does not exceed that demanded by the chemical theory of combustion by more than about ½ per cent. An experiment is illustrated in Fig. 1. When a mixture of gas and air in the proportion mentioned is pressed, in the direction of the arrow, against the fireproof porous plate A and through it, and is ignited, the most rapid combustion takes place without flame in the pores nearest to the circumference of the plate, and the latter is maintained incandescent, radiating an astounding amount of heat.

The discovery of this effect was made at the same time by Engineer Schnabel of Berlin and by Professor Bone of London. The "Thermotechnische Gesellschaft" was formed in Berlin to exploit it, and in London the "Bonecourt Surface Combustion, Ltd." took charge. In July, 1912, these corporations were merged in all matters excepting territory.

To obtain the full effect, a coarse granulated mass of fireproof material as well as a material with very fine pores is required for some of the applications of the process. A certain grade of chamot has been found suitable for the porous mass, but it was only after many experiments that Schnabel developed a coarse granular material sufficiently cheap for the purpose, and this material, which sustains temperatures of above 2,000 deg. C. without disintegration or fusion, has been adopted by both the concerns referred to.

One of the simplest applications of the method is illustrated in Fig. 2 representing a blacksmith's forge in which no coke or coal is used, the granular mass on top taking its place, so far as covering up the work during heating is concerned, while the gas mixture is led into the porous substance in the center pit under pressures and in quantities varied according to the heat wanted. This clean fire, in which there is no surplus of hot uncombined atmospheric air to oxidize the metal, is especially valuable for the forging of high-speed steel tools.

The Skinningrove company in England has for more than one year had a flameless-combustion steam plant in operation. The gas used is piped from a cokery. Trials made by prominent

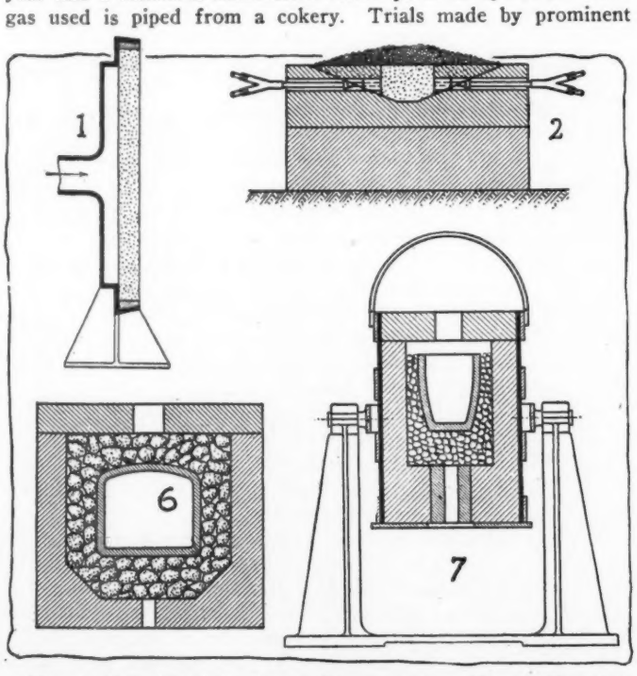



Fig. 1—Experimental chamot flame screen. Fig. 2—Flameless blacksmith's forge. Fig. 6—Bonecourt muffle oven. Fig. 7—Melting pot for crucible steel production by surface-combustion method

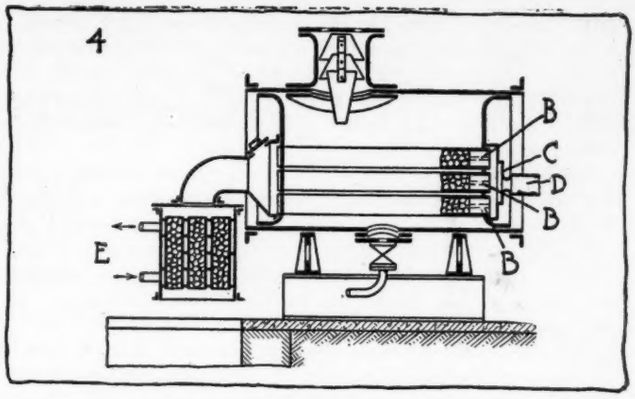



Fig. 4—General plan of flameless surface-combustion steam generator with feed-water heater. Later models much compacter

English and American boiler specialists have demonstrated for this plant the previously incredible steaming capacity of 105 kilograms per square meter. The contrast with the maximum of 45 kilograms for ordinary fire-flue or water-tube boilers is striking. The fuel efficiency varies from 93 to 95 per cent.; or, in other words, there is scarcely any loss of heat units in converting water into steam by surface-combustion of gas. In this case the gas mixture is drawn into the boiler by a suction fan producing 1/20 of an atmospheric pressure. It could of course be forced in, as well, with a centrifugal blower.

A boiler erected in Germany generates steam for 500 horsepowers. It is shaped as a drum, as shown in Fig. 3, and is about 3 meters in diameter and 1.2 meter thick. Each of the flameless-fire tubes generates 20 to 25 pounds of steam per hour with an interior diameter of 75 millimeters and walls 6 millimeters thick. All the fire tubes are in the lower half of the drum, while the upper part is braced with tie-rods. Fig. 4 shows the firing method. At the front end of each tube there is a fireproof [non-porous] stopper with a central bore, 13 millimeters in diameter, through which the gas mixture flows in. This protects the joint with the boiler wall against excessive heat. Adjacently to the stopper the filling with granular material begins. The grains measure about 10 millimeters each. [Blum doesn't mention how far the material extends and does not say whether any of the fine porous chamot is used, as, in fact, throughout his account he refrains from publishing definite details. It seems that the chamot is used only for constructions in which outside air cannot readily be barred and in which the heat is utilized for radiation and light rather than for convection.] In front of the tubes there is a mixing chamber receiving the gas and air sepa-

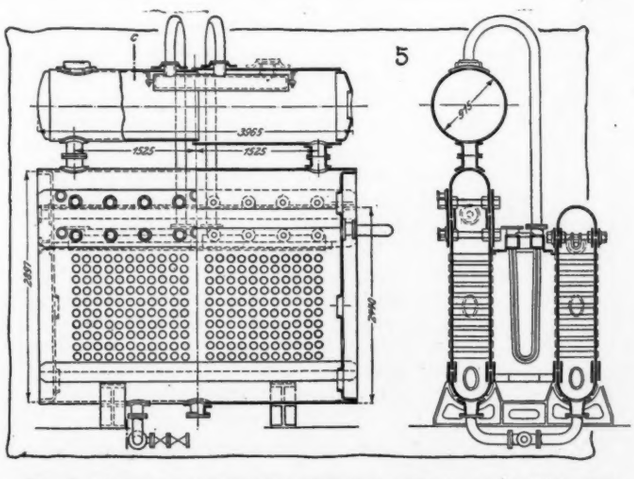



Fig. 5—Very compact marine flameless surface-combustion generator, tripling ordinary steaming capacity and wasting only 3 per cent. of heat units of fuel

rately from feed pipes D. By shutting off the latter, groups of 5 fire tubes can be taken out of action to vary the steam generation. If pressure-feed is used, there is a chamot plate in front of each stopper, acting as a screen to prevent heat from striking back if the pressure subsides. The feed-water heater E is arranged on similar principles.

The operation is as follows: Air and gas are admitted to the fire tubes and the mixture is ignited by means of a specially arranged torch at the ends of the tubes. This gas burns at first with a flame, but when the proportion between gas and air is adjusted [the air supply reduced] and the pressure is regulated, the flame gradually draws back to the interior of the tube. The real combustion zone begins at the inner end of the fireproof stopper, and here—which is the most important feature—only in the middle of the granular mass. A core of about 100 millimeters long and 20 to 25 millimeters in diameter is here raised to brightest incandescence, reaching a temperature estimated at 1400 to 1600 deg. C. The heat drops rapidly toward the tube walls, and the material adjacent to these is only red-hot. The metal of the tubes thus does not come in contact with the fiercest heat, which explains why they endure the service indefinitely. The cooling of the gases is also very pronounced toward the rear end of the tubes. Measurements have shown that 70 per cent. of the steam is generated by the front ⅓ of the tubes, 22 per cent. by the middle ⅓ and only 8 per cent. at the rear end of the boiler. The temperature of the exhaust gases is only about 200 deg. C., and this is reduced to 95 degrees in the feed-water heater, the water being raised from 20 to 50 degrees. The proper pressure and gas proportion depend upon the type of gas and the nature of the granular material. The radiation losses of the boiler amount to 1½ per cent., while the pressure or suction fan absorbs 2.5 per cent. of the power and the exhaust gases carry away 3 per cent. of the heat value of the fuel. In this radical thermic economy, in comparison with which that of the internal-combustion engine appears as wanton waste, lies the promise of widespread industrial applications.

Fig. 5 shows the construction of a surface-combustion marine boiler of a design much compacter than that shown in Fig. 3. Experiments in England with a plant of this type showed a steaming capacity of 145 kilograms per square meter, and a German commission of incredulous specialists verified this figure by tests extending over a full week.

### Liquid Fuels Tried With Success

Encouraged by the results obtained with gas, the engineers of the movement instituted trials with liquid fuels and in fact with tar oil. The success was so epochal that a locomotive in England is now being equipped with a surface-combustion boiler. If the author is correctly informed the New York Central railway company in New York also has the intention of building such locomotives, which by their absence of all smoke promise to make electrification superfluous.

Among other recent progress in the development of the method, it is to be mentioned, that it has been found possible to work with reduced fuel pressures by using suitable diameters of the tubes and by employing other means of which nothing can be said at the present moment owing to the unfinished condition of the patent rights relating thereto. This is of especial importance for applying the flameless method to lighting, heating and cooking purposes. [It also indicates a certain likelihood of adaptability to automobile motor requirements.]

In Figs. 6 and 7 there is outlined a suggestion of how flameless surface-combustion—now generally termed Bonecourt combustion, a copyrighted name and trademark—may be used with enormous saving of fuel for muffle ovens, which are used so largely in the automobile industry for casehardening work and other forms of the heat treatment of steel, and for the melting pots in crucible-steel works, where each crucible usually holds only about 30 kilograms of metal and with the present arrangements never can be uniformly heated.

[The author refers with some detail to a large number of other industrial applications, some of them of wide sweep, but the facts and ideas which bear in any manner upon the possible adaptation of the Bonecourt heating method to automobile purposes are contained in the foregoing extracts.—Ed.]

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**Double Ignition.**—In reply to an inquiry as to the advisability of changing a single spark magneto ignition to a dual spark ignition by arranging two plugs in series H. Féron writes in part: It is not always an improvement when single ignition is changed to double in an existing motor. To be sure, the double spark always hastens the combustion of the gas, but the rate of combustion ought to be proportionate to the maximum piston speed of the motor. If the motor is not adapted for high piston speeds, the rapid flame propagation will result only in inconveniencies. The motor may, for example, be so small in proportion to the weight and gear ratio of the vehicle that a high piston speed on direct gear becomes impossible. The diameters of valves and pipes may be so small, purposely, as to check motor speed, or the shapes of the cams may be such that the valve action cannot "follow." In such cases a double spark will only give very high pressures which cannot be utilized; the motor will run hard, with a tendency to vibrate from the checking of the explosions. Without any compensating advantages, a more rapid wear and tear of pistons and connecting-rod bearings will be experienced.

In certain motors in which the piston speed is too high for the form of the combustion chambers double ignition may take the place of variable spark-timing by quickening combustion, but the case is rare. On the other hand, the writer has seen motors which ran acceptably with fixed timing and only one spark plug and which began to knock desperately at the slightest slowing of the motor when fitted with double ignition.

With two spark plugs in series, a stronger magneto is needed than for ordinary ignition, because the spark must jump the gap between terminals in two places, which involves overcoming about twice as great a resistance as the jumping of one gap, especially if the compression is high.—From *Omnia*, April 12.

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**Sounds of the Motor.**—Unless the silencing of the motor is carried very far—and perhaps farther than desirable—the experienced driver can tell a good deal about the condition of the motor by the sounds it emits. This fact is widely known, but it does not seem to be so well understood that the sounds, or rather the driver's perception of them, is influenced considerably by factors which have nothing to do with the condition of the motor, and that such factors therefore should be taken into account.

A leather cap well pulled down over the head acts as an ear trumpet and magnifies most sounds, while it seems to muffle others. Also, when the ear muffs of a cap are let down, one can frequently tell loose bearings much more plainly than with the ears unobstructed. The raising of the top of a car brings all small noises from the motor out very strongly, unless a windshield is used, and therefore "troubles" are sometimes discovered during a rain which have existed for a long time, but the symptoms of which could not be heard till the top caught the sound The mudpan has a similar influence.

Surroundings and road conditions modify all sounds. A traction chain which seemed almost noiseless on an open stretch of road makes an astonishing "racket" on a narrow paved street. In a very narrow street the noise of the exhaust makes itself heard distinctly in spite of the muffler.

When a car is passing close by a short piece of wall with the cut-out open, the reflected roar will sometimes give a sudden scare to a driver not thoroughly familiar with the cause. On mountain roads the echoes may easily give even an experienced driver an impression of a slipping clutch or of irregular ignition. On a sunken road the motor breathes deep and full, on a dike in a higher key and more faintly. On a hard road the sounds grow sharp, on a soft one indistinct. Sand and snow reduce all noises surprisingly.—From *Auto* (Berlin), March 1.

# Detecting Resistance - Saving Fuel

## PART III.

### Tests Made on Actual Cars with Accelerometer Show Varying Resistance on Similar Cars—Internal Friction May Be Tested

By Professor W. C. Marshall

THIS is the third of a series of four articles on the accelerometer and its use. The accelerometer is an instrument for determining amount of the accelerating and retarding forces of a car under all conditions. By its use the power required to drive a car, the condition of the brakes, the condition of the running gear, the friction of the motor and a number of other important details can be either read directly or be deduced by very simple processes.

In appearance the accelerometer resembles an alarm clock. It is cylindrical in form, 4 inches in diameter and 2.25 inches in height. It is carried in the car and is not attached thereto in any manner whatsoever, except that it must rest on a fixed horizontal platform which maintains a constant relationship to the car.

At a paper read at the Metropolitan section of the Society of Automobile Engineers during the April meeting, considerable discussion took place on the value of electric testing outfits for manufacturing plants. It was pointed out that one of these outfits cost in the neighborhood of $1,400 and that the average factory would require anywhere from ten to twenty instruments. This enormous outlay would not readily be made by a factory unless they were fully assured that the return would be adequate.

With the accelerometer, many details in addition to those learned on the road test would be learned, and while the road test would not be diminished in any way, the additional details could be learned without any additional time being required in making them and they would go to make a more detailed accounting of the performance of the car and would furnish a check on the condition of running gear and the power required to drive the chasis than the simple road test would do.

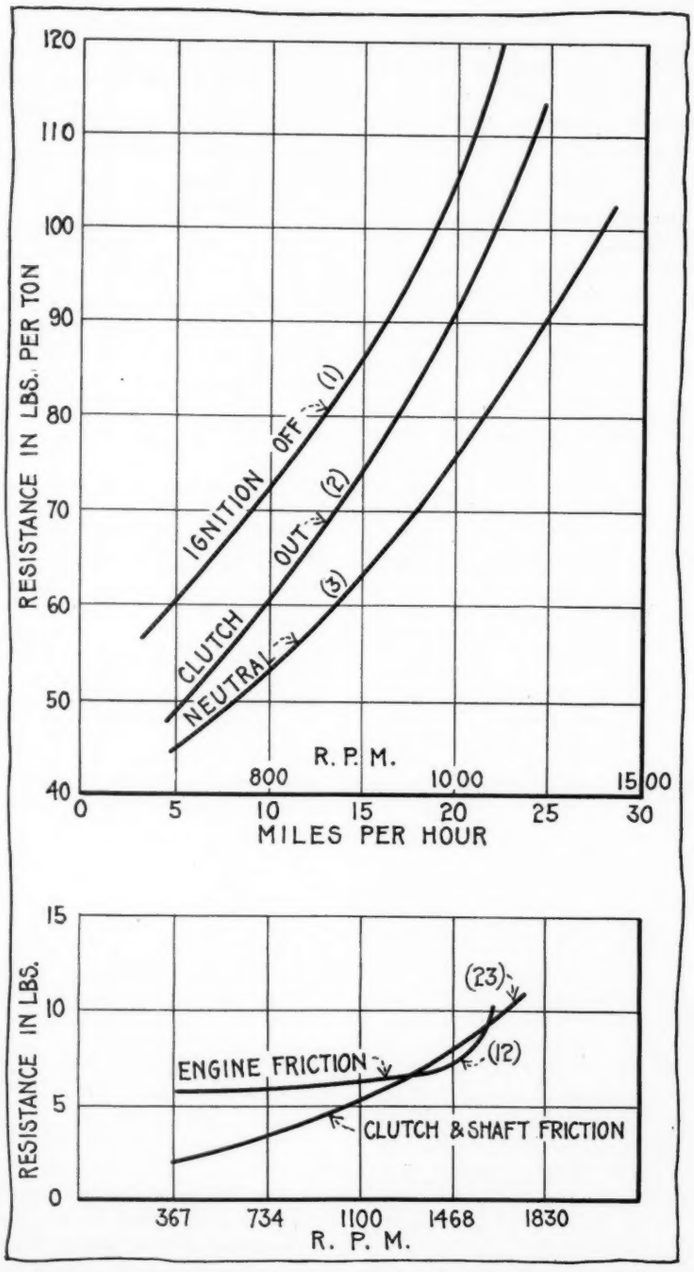



Fig. 1—Two sets of curves, the lower being deduced from the upper, showing the resistance of a given car with the ignition off, the clutch out and the gears in neutral

Actual tests show a wide difference in the resistance of two cars of the same weight and horsepower. This means that these two cars would be using a varying amount of fuel to drive them if the efficiencies of the motors were the same and the carburetion was all that could be desired on both cars.

Knowing the performance of the car the difference made by different road surfaces may be obtained. A car run over asphalt will have less road resistance than a car run over a road which is less smooth. If a test is made with the engine ignition switched off and then with the clutch out the resistance of the motor due to its internal friction may be obtained. Various other data can also be obtained. In the tests which are mentioned below the methods of working out these details are explained.

In the last issue of THE AUTOMOBILE, Part II of this series, the results of several tests made by this

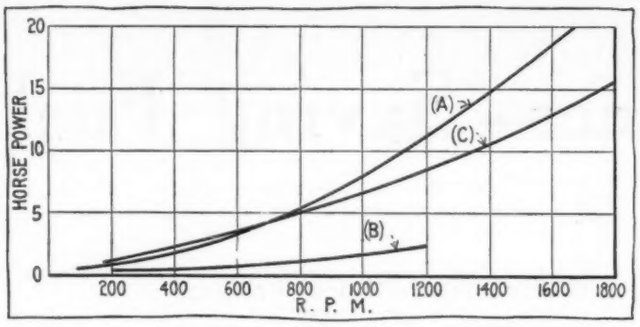



Fig. 2—Curves of engine friction secured by different investigators. The high curve, A, was secured by Reidler

instrument on actual cars were detailed. This week these tests are continued and a clear conception of the value of the instrument may be obtained.

Results of certain tests made by the author on a four-cylinder, four-passenger car are given below. The car weighed 2.077 tons, carried four passengers and had a windshield, which was up.

The road was good, hard macadam and level. There was no wind.

| Speed, Miles per Hour | Coasting Resistance in Pounds per Ton | | | | |
|---|---|---|---|---|---|
| | Ignition Off | | Clutch Out | | Neutral |
| 15 | 90 | | ... | | 60 |
| 20 | 100 | | 60 | | 70 |
| 25 | 110 | | 70 | | 80 |
| 30 | 120 | | 80 | | 80 |
| 35 | 135 | | 90 | | 100 |
| 40 | ... | | 100 | | ... |
| | ON SMOOTH | | ASPHALT | | |
| | Readings | Average | Readings | Average | |
| 10 | 70–70 | 70 | 45–40 | 42.5 | .. |
| 15 | 80–70–80 | 77 | 55–60 | 57.5 | .. |
| 20 | 80–90–90 | 87 | 55–60 | 57.5 | .. |
| 25 | 90–90–80 | 87 | 70–70 | 70 | .. |
| 30 | 110–110 | 110 | 80–75–80 | 78 | .. |

There were two or three readings taken in the asphalt tests, as indicated by dashes between the numbers in the above table.

The curves for the resistances are plotted in Fig. 3.

The horsepower curves are broken lines and were only calculated for the resistances on macadam.

The neutral gives more resistance than when the clutch is disengaged, due either to the inertia of the multiple disk, clutch or to the dragging action of the disks of the clutch, which are on the crankshaft.

The friction of engine is shown in Fig. 4, the curve being plotted from the curves A and B in Fig. 3.

The resistance of grades may be read from the accelerometer by noting the percentage grade mark and then the retardation number opposite. For example, opposite 2 on the scale marked downward gradient is read 40 on the retardation scale. This means a 2 per cent. grade is equal to a retarding force of 40 pounds per ton.

Mr. Wimperis has published some results of experiments made on cars fitted with iron and with rubber tires which show the coasting resistance on various kinds of roads at speeds of 10, 15 and 25 miles per hour. These are good so far as they go, but more evidence is needed to accurately determine the laws of resistance at high speeds with pneumatic tires.

Table I following gives the results of these experiments and shows the high resistance of muddy roads, also the low resistance of iron tires on granite blocks.

The results on hard roads appear to be large as compared with those determined by other experimenters.

In the following tests, Table II, also made by Mr. Wimperis, smaller resistances were obtained than those above, even at higher speeds.

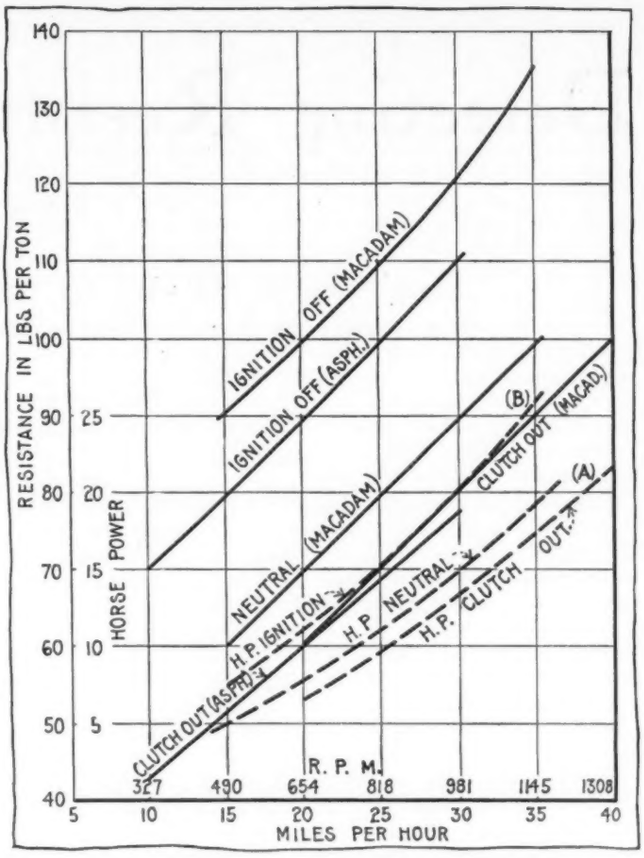



Fig. 3—Effect of road resistance on the total. The above curves show a comparison between macadam and asphalt

The roads had good, hard surfaces, the tires were of solid rubber and there was no wind.

The difference between the resistances at the clutch and with neutral gear is quite marked, due probably to pumping action of gears running in the grease of the gear box.

TABLE I.

| Nature and Condition of Road | Declutched Coasting Resistance Pounds per Ton | Speed in Miles per Hour | Kind of Vehicle and Weight in Gross Tons | Tires |
|---|---|---|---|---|
| Tar macadam road..... | 65 | 10 | Motor wagon | Steel rear Front sol. |
| Tar macadam, soft and cut up..... | 140 | 10 | Wgt. 4.3 tons | Rubber |
| Granite blocks..... | 50 | 10 | Wgt. 4.3 tons | Rubber |
| Hard, dry main road.... | 73 | 15 | Heavy touring car, wgt. loaded, 225 tons | Solid rubber |
| Half rolled road metal... | 150 | 15 | Heavy touring car, wgt. loaded, 225 tons | Solid rubber |
| Clean wood pavement... | 70 | 10 | Motor wagon | Solid rubber |
| Tar macadam, dry, hard | 70 | 10 | Wgt. loaded 4.35 tons | Solid rubber |
| Tar macadam, very muddy and sticky.... | 95 | 10 | Wgt. loaded 4.35 tons | Solid rubber |
| Road metal partly rolled | 120 | 10 | Wgt. loaded 4.35 tons | Solid rubber |
| Road metal unrolled.... | 200 | 10 | Wgt. loaded 4.35 tons | Solid rubber |

A car moving up a 2 per cent. grade at constant speed would overcome a resistance of 40 pounds per ton due to grade plus a resistance due to rolling friction, wind, etc. If this latter resistance was, say, 85 pounds per ton, then the total resistance overcome would be 125 pounds per ton.

If the speed was 20 miles per hour on the grade, the probable

**TABLE II.—Coasting Resistance on Motor Wagon**
**Weight loaded 3.28 tons—no wind—hard main road**

| Speed. Miles per Hour | Coasting Resistance in Pounds per Ton (Gross) | | |
|---|---|---|---|
| | Ignition Off | Clutch Out | Neutral Gear |
| 0 | 55 | 40 | 35 |
| 2½ | 55 | 40 | 35 |
| 5 | 57 | 42 | 40 |
| 7½ | 60 | 45 | 40 |
| 10 | 65 | 50 | 45 |
| 12½ | 75 | 55 | 50 |
| 15 | 85 | 63 | 55 |
| 17½ | 105 | 80 | 60 |
| 20 | ... | 95 | 65 |
| 22½ | ... | 110 | 70 |
| 25 | ... | ... | 80 |

speed on the level would be 37 miles per hour when the engine was exerting the same amount of power.

Conversely suppose a car to run on a level road at 40 miles per hour, its resistance being 90 pounds per ton. What grade can it ascend at 25 miles per hour if the engine can exert the same power?

The accelerometer can be used in conjunction with measurements of gasoline used, to determine the thermal efficiency of the motor, when a car is run over a route the grades of which have been determined. The car resistance is first measured at the speed or speeds to be maintained during the run. The average resistance is then calculated for the whole run, taking into account grades and levels.

The average resistance of the car in pounds, the distance covered and the amount of gasoline used having been determined, we then find the thermal energy in the gasoline and the amount of work performed in driving the car. Expressing the work done in foot pounds gives the expression:

$F = R \times 5280 \times M.$

F = foot pounds of work.

R = average resistance of car in pounds.

M = miles per gallon of gasoline.

The thermal energy in the gasoline would be approximately 15,941,220 foot-pounds per pound, the total energy being $6 \times$ 5,941,220 foot-pounds per gallon.

The brake thermal efficiency of the engine would be, therefore,

$$E = \frac{R \times M \times 5280}{6 \times 15{,}941{,}220} = \frac{R \times M}{18000}.$$

In this formula the specific gravity of the gasoline was assumed to be .72 per cent. and the weight 6 pounds per gallon.

Acceleration measurements are useful in making a comparison of the power of the motor as exerted to produce rapid acceleration at certain speeds. For example, consider two cars running at speeds of 20 miles per hour. The throttle is then opened to give the maximum power of the motor, which at once produces an acceleration of the car.

In one case the needle reads 2 feet per second, while in the other it only moves to 1.8 feet per second.

As force = mass × acceleration, if the cars weighed the same and had the same resistance to motion, the power of the motors would carry it directly as the acceleration, viz.: 2 to 1.8.

There is often found to be a great difference in the power of various cars due, not to the resistance, but to the action of the carbureter when furnishing the gasoline vapor to the motor.

Some carbureters furnish such a rich mixture when the throttle is opened wide that it will not ignite and the motor slows down.

Such a carbureter does not permit the motor to produce rapid car acceleration, whereas a well-designed one giving a uniform mixture, enables it to respond instantly to wide open throttle.

If the torque curve of a motor, previously determined from laboratory tests, is reduced to a curve denoting the power available at the clutch, we have a means of determining the probable power which can be used for acceleration.

In Fig. 5, at A is shown the resistance curve of the Pierce-Arrow touring car.

The revolutions per minute of the motor were calculated from 37-inch wheels and a gear ratio of 3.3 on fourth speed.

From the laboratory test of a Pierce-Arrow six-cylinder motor made by Herbert Chase at the Automobile Club of America, the brake horsepower was obtained at various speeds.

The horsepower curve used was the one marked A in the test, and was obtained with muffler and throttle wide open.

The horsepower at each speed was then reduced to resistance at the clutch in pounds per ton and the torque curves were plotted from gear rations of 5.44 for third, 7.095 for second and 12.639 for first speed.

(*Continued on page 949*)

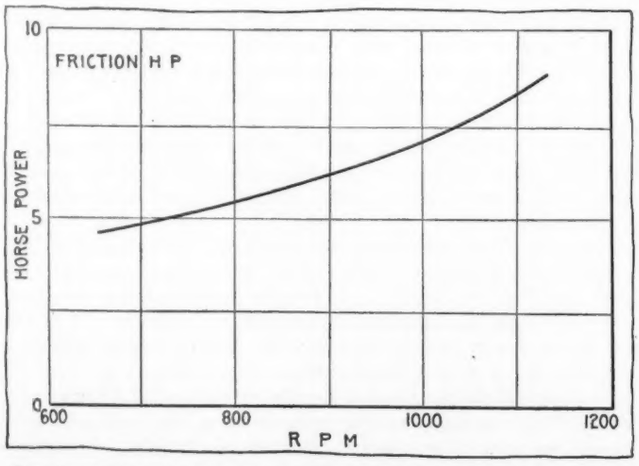



Fig. 4—Curve of frictional horsepower plotted on a basis of revolutions per minute with horsepower ordinates

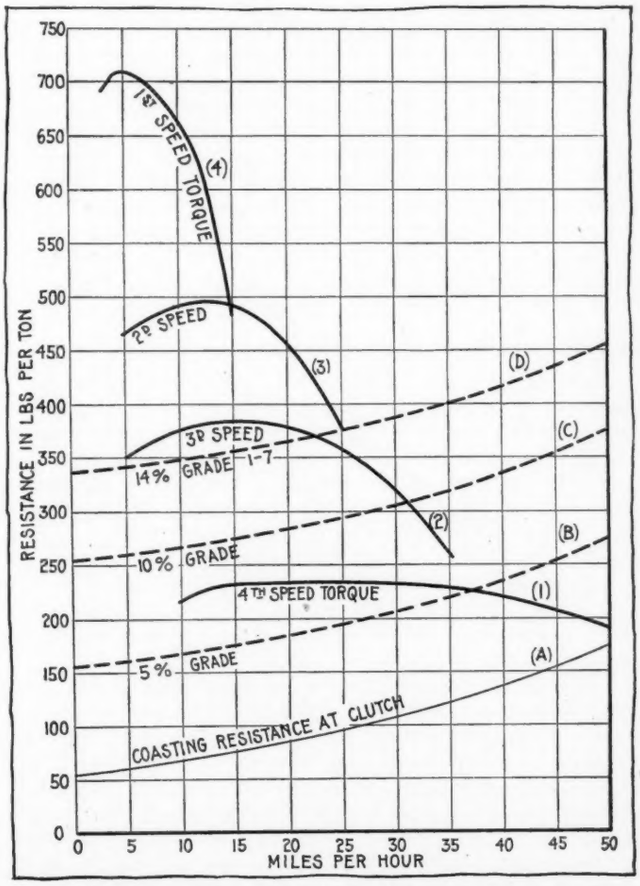
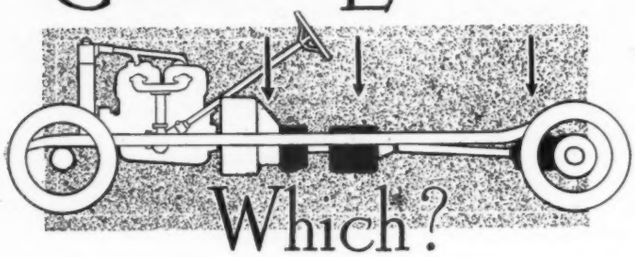



Fig. 5—Resistance curves of a large touring car running on different grades at different gear ratios

# The Engineers' Forum

## Gearbox Location



## Which?

### Leading Automobile Engineers Show as Much Diversity of Opinion on This Question as on Horsepower

*Marmon Favors Location on the Rear Axle*
*Holmes Calls It a Commercial Problem*
*Wall Also Likes the Central Location*
*Planche Is in Favor of Rear Axle Type*
*Smith Is Another Rear Axle Advocate*
*Edwards Finds Amidships Type the Best*

THE article on "The Rear Axle Gearbox," by S. D. Waldon, which appeared in THE AUTOMOBILE for April 17, excited considerable interest among the leading automobile engineers of the country in this important question of design, and the following responses to inquiries regarding their individual views on the subject are very interesting, especially because of the wide diversity of opinions evident. So many communications have been received that they will appear from week to week in the Engineers' Forum as space is available. The arguments advanced for and against the various types of construction in this particular are those of experts who have studied the situation thoroughly and therefore deserve the attention of everyone interested in the problems of automobile design and construction:

#### *Small Increase in Rear Axle Weight—Marmon*

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—**The incorporation of a motor car gearset with the rear axle can be accomplished, if a little ingenuity is used, with a surprisingly small increase in the total weight of the rear axle. A 5 to 7 per cent. increase in the weight of the axle is all that is necessary.** This is less than the variation in weight caused by the use of different styles of demountable rims.

The rear axle gearbox eliminates one grease retaining reservoir by utilizing the oil bath already provided for the bevel gear. It results in a quieter operating car than if the same gearset were placed under the footboards which act in the nature of a resonator.

If properly designed, the rear axle gearbox is far more accessible than one located under the body, and if occasion arises that necessitates the opening up of the gearbox, the finely-finished and upholstered portions of the body do not suffer from being covered with the contents of the gearbox. The most important advantage of the rear axle location, however, comes from the fact that the magnification of the torque, due to the use of the various gears in the gearbox, is transmitted directly to the bevel pinion, and not through the universal joints and the propeller shaft. This prolongs life in the universal joints themselves, and permits the selection of a propeller shaft of small diameter that will carry the torque of the motor with some torsional deflection. Such a propeller shaft will perform the functions of a spring drive, and compensate for the variations in angular velocity that take place between the flywheel of the motor and the road wheels during each revolution of the motor, and a decidedly smoother operating car results.

Such construction is, of course, impossible with the gearbox near the motor, as the propeller shaft must be designed to take anywhere from four to eight times the torque necessary in the previously discussed constructions. The effect of the spring drive is then lost.—HOWARD MARMON, Nordyke & Marmon Co., President Society of Automobile Engineers.

#### *A Question of Economy in Tires—Holmes*

SYRACUSE, N. Y.—Editor THE AUTOMOBILE:—The location of the gearbox on the rear axle is but one of the points now prominently before the automobile public in connection with the demand for more economical cars.

**The total cost of a car, meaning everything paid for same from first to last is in some cases an enormous sum. Tire cost is a very large factor in this account. For this reason the location of a gearbox correctly on a rear axle adding its weight to the unsprung weight of axle is no longer a question of engineering purely—it is a business proposition, or perhaps should be called commercial engineering.**

Tire cost, fuel cost, everything that goes to make up the total cost of a car must be reduced in time. This simply means less weight, and especially less weight in the unsprung parts.—A. HOLMES, Engineer H. H. Franklin Mfg. Co.

#### *Racing Shows Amidship Advantages—Wall*

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—In regard to the proper position of the gearbox on a motor car, while there has been a diversity of opinion in the past in regard to the relative advantages of the three arrangements generally used, attaching it to the engine, placing it amidship, or attaching to the rear axle, it now appears that the majority of engineers are realizing that to place the gearbox amidship has a number of advantages over using it either as a part of the engine or as a part of the rear system.

The disadvantages of placing the gearbox on the rear axle are very evident, as it subjects it to very hard shocks when traveling over rough roads, due to the fact that it is not protected by the springs of the chassis, which also accounts for the severity of this construction on the rear tires. It is in a position where it is very difficult to get to in making any necessary adjustments or repairs, besides the disadvantage of having long control rods running to the hand levers. It is also much more liable to meet with accident when hung low in this position.

Attaching the gearbox to the crankcase of the engine has the advantage of compactness and reduction in expense of manufacture, so that it is generally found on the cheaper cars. **It has the serious disadvantage, however, of inaccessibility to the clutch parts and the difficulty of proper suspension so as to get the maximum resistance to strains, as it is generally designed as a cantilever supported by the rear arms of the engine, or else supported at the rear end and acting as part of a truss to sustain the weight of engine. With either arrangement a great and unnecessary strain is placed on both the gearbox and crankcase.**

Placing the gearbox amidship has a great many advantages, though the slight disadvantage of requiring a little more expensive construction than attaching to the engine; the great advantage of this position, however, is its flexibility and the fact that there is considerable less strain on the bearings of the gearbox in this position, due to the use of universal joints both at the front and rear ends. Hanging it amidship also makes it extremely accessible and allows ready access to the clutch and its parts; it assists in the proper balancing of car, dividing the weight between the two axles, is up out of harm's way on rough roads, and is in a position where even serious accidents can hardly damage it.

Also it makes an extremely convenient design with center control, and does not require the control shafts to slide out of case, necessitating packing boxes; it is in a position where it can be easily lubricated and looked after, and probably receives much better treatment than in any other location.

For a number of years the National car has had the gearbox placed amidship with excellent results, and considerable of its success in the racing field can be attributed to this design. It is a fact, though not generally known, that, with probably one exception, all cars that have become prominent in racing have had the gearbox placed amidship, which is good proof of the flexibility and dependability of this construction.—Wm. G. Wall, Chief Engineer, National Motor Vehicle Company.

### *Rear Axle Type Is More Accurate—Planche*

Detroit, Mich.—Editor The Automobile—The problem that confronts the engineer, who is ready to establish the design of a car, can be reduced to the following simple expressions:

**Place the motive power in a chassis and transmit that power to the rear wheels with the least possible loss.**

**Lower the center of gravity of the car to the minimum height compatible with necessary road clearance.**

If these two conditions are fulfilled, the car built by this engineer will be economical, of great stability, easy to drive and comfortable. The first condition is filled when the center line of the crankshaft passes through the center of the rear axle—it is a straight-line drive.

In practice this straight-line drive can be obtained through the building of motor, gearbox and rear axle in a solid unit, with the front of the motor pivoting at the starting crank—the only car built along this line is a French car—the Simplicia. In this case no universal joint is used and the efficiency at the rear wheels is maximum.

The next best solution is the Chevrolet design. It is also a straight-line drive when the car is loaded and rolling on a smooth road. The gearbox is mounted as a unit with the rear axle and the driveshaft is also a unit with the gearbox. This makes a rigid assembly which is bolted to the frame by means of a large pivoting fork and is connected to the motor by a single universal joint. The universal joint operates only when there is a deflexion of the springs, and as the springs deflect very little under load, the loss of power is reduced to a minimum through the universal joints. That first condition is also filled when the motor and gearbox are built as a unit and placed in a straight drive with the rear axle transmitting power to the rear axle through one universal joint.

**The most inefficient way of transmitting power to rear axle is when the motor, gearbox and rear axle are all separate units connected together by universal joints because the chances of misalignment increase, more universal joints are needed, consequently more power is lost.** Then, if we consider only the question of transmitting power the most efficiently to the rear wheels, we would consider the gearbox, rear-axle unit as equal to the motor-gearbox unit, but both superior to the motor, gearbox and rear axle as separate units. But if we consider the second condition we have formulated above, we find that the gearbox, rear-axle unit answers that question better than any of the other two solutions. Effectively in that type the weight of the driveshaft, torsion tube, transmission is brought closer to the ground consequently the center of gravity of the car is lowered, the load on the rear wheels is increased giving better adherence to the ground and the stability of the car is also increased, affording more security to the passengers for high-speed travel.

**One could also say that the building of rear axle and gearbox as a unit, or of motor and gearbox as a unit removes the uncertainties of manual labor in assembling the car and leaves it to the more accurate work of the machine tool.**

These are the reasons why we prefer in our own opinion the mounting of driveshaft and gearbox as a unit with the rear axle.—E. Planche, Chief Engineer Chevrolet Motor Co.

### *Rear Axle Unit Is More Quiet—Smith*

Indianapolis, Ind.—Editor The Automobile:—Referring to the discussion recently appearing in The Automobile relative to the merits of the three present methods of installing the gearbox in passenger automobiles, would state that we naturally favor the suspension of the gearbox in unit with the rear axle, for four particular reasons:

**First, on your lower speeds it reduces the torque on your universal joint and drive shaft in direct proportion to the ratio of difference between your second or low speed, and engine speed, which is a decided advantage in a stiff pull.**

Second, it reduces to the extent of the weight of your gearbox unit the dead weight on your frame, hence the weight supported by the springs, and gives you the advantage of that much more flexibility in your spring suspension.

Third, you can shift gears much more smoothly, due, we believe, to the longer linkage and greater flexibility of your gearshift mechanism to say nothing of the wide range of choice for the enginer in the location of his control levers which may be set practically anywhere to conform to his particular idea of accessibility.

**Fourth, the gears are located so far back that the slight growl or hum from the constant mesh gears and idle pinion is nearly, if not entirely, lost. This is one of the reason that the rear axle transmission is quieter than other types.**

There are several lesser arguments in favor of the rear axle gearbox, but the four above, we believe, are the chief reasons that are leading the trend of motor car builders today to adopt an ever-increasing proportion of the rear axle gearbox over the other types.—J. M. Smith, Factory Manager and Engineer, Henderson Motor Car Co.

### *Is More Accessible Amidship—Edwards*

New York City—Editor The Automobile:—Referring to the question as to whether it is better to mount the gearbox of an automobile as a unit with the rear axle, as a unit with the motor, or as a separate unit approximately amidship in the chassis.

As a unit with the rear axle: A disadvantage is that it adds that much unsprung weight to be carried by the axle and the tires. It also adds the weight of the gearbox to a part of the axle where it is least desirable. On the other hand, the mounting of the gearbox on the rear axle has the advantage of deadening the noise of the gears.

As a unit with the motor: This construction has the advantage of clean design and if used with the three-point suspension no trouble should be experienced on account of the length of the complete unit of engine and gearbox.

As a separate unit: The advantage is that the gearbox is a separate assembly as a manufacturing proposition and by the use of universal joints there is no undue strain placed on the bearings of the gearset, due to weaving or warping of the chassis. In case of trouble with the gearset it is easily accessible, removed or replaced.—H. J. Edwards, Engineer, Edwards Motor Car Co.

# Cost-Keeping System for Warehouse Trucks

## Exact Daily and Monthly Records Enable Operating Companies To Get Most Economic Service from Vehicles

### Long Time Spent in Loading and Unloading Trucks Causes High Cost Per Mile Traveled

THE closer the profits of a given business the more urgent is the requirement for unerring records, as gain or loss plays a much more pronounced rôle in such an undertaking, owing to its high percentage with relation to the total or net profit. Consequently, if motor trucks are applied in a line of work where profit is small, systematic cost-keeping is a desideratum if not a necessity; whereas, if they are used without profit and merely to the purpose of advertising, by coupling in the common mind the name of a company with the idea of up-to-dateness—which is not unfrequently the case now—the strictest economy, controlled and recorded by exact compilation of data, is needed.

One of the businesses of this nature is the storage-warehouse trade. In this line of enterprise, which often includes the moving of furniture, all work is strictly non-productive, and consequently the profit is small, since profit accompanies principally the making of one product into another. The two sources of income in this business, then, are moving furniture and storing it. The latter department is dependent for its rentability upon the extent to which the buildings of the company may be utilized and is roughly proportionate to the magnitude of the company's business; but the former, being founded upon work, human and animal or mechanical, offers possibilities for a variable profit, which is proportionate to the low cost of transportation on one hand, and to its efficiency—speed, safety and dependability—on the other. Safety refers to the possibility of entrusting a van or truck with goods, feeling certain that nothing ill will happen to them; dependability, that they will be delivered on time.

As the profit on furniture transportation is very variable, the advantage of exact records which are a means to the end of strict economy is obvious. By keeping all information relating to the work done by trucks and their cost of maintenance, the economy of operation can be more and more increased, as waste may be diminished by eliminating its several causes. To put a truck fleet, large or small, on a basis of increasing economy, a cost-keeping system such as that described below may be used to advantage, it being constructed after abstracting the principal features of several schemes in use by various storage business houses.

This system comprises four forms, namely: a daily time-checking sheet, a daily cost-and-work sheet, a monthly trouble-and-repair card and a monthly record sheet. The first is a garage form, the second made out by each driver after the day's work, the third is a ledger form filled out by the garage-and-shop foreman and the fourth by the bookkeeping department.

The checking sheet is 15 inches square, printed on white ledger paper which is ruled red from side to side and blue from top to bottom and printed black, as shown in Fig. 3. The sheet is secured to a board near the garage door on the first of the month, and every time a truck enters or leaves the place, its time is put down on the sheet. Trucks engaged in work of moving furniture do not make more than two trips a day, while machines that do may be recorded on a separate sheet, using two columns instead of one. This sheet serves much the same purpose as the weekly time card in shops.

To account for the distribution of time, in addition to giving the details of the work done by a truck, a daily cost-and-work sheet is used. When a truck returns in the evening or night, the driver fills out a blank, Fig. 2. The latter is 12 by 8 inches, printed on letter stock of medium thickness, ruled according to the same color scheme as Fig. 3 and is made out with a carbon copy. The driver puts down the number of his truck, the date, his name and that of the helper and then proceeds to give all the required data referring to the several trips. The latter are numbered. The

CAR No..... Month of.....191.... MONTHLY RECORD TOTAL EXPENSE $.....

| Day | Mi'es | Hrs. | Hrs. Trvld. | Gas $ | Oil $ | Repair $ | Gar'e $ | Equ't $ | Overhd. $ | Driver $ | H'per $ | Total | Cost Mile |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |

Transferred and Totaled by..... Checked by .....

*Fig. 1—Monthly truck-cost record*

CAR No..... Date.....191.... DRIVER..... HELPER.....

| Trip No. | Addresses | Checked Out | Checked In | Time spent Ldg. | Time spent Uldg. | Miles | Hours stand. | Gas | Oil etc. | Repairs, Equip., &c. | Cost | Miscel. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

*Fig. 2—Daily work-and-cost sheet*

addresses from and to which furniture was taken, the time of checking in and out of the garage, the time spent in loading and unloading the truck, the miles traveled on the trip as shown by the tripmeter mechanism on the speedometer, and the length of time during which the truck was standing are noted. The quantities of gasoline, oil and grease used are also recorded. If any repairs or the purchase of parts, fuel, etc., on the road were necessary, the driver states this, together with the price. Finally, there is a space for miscellaneous remarks. The original of this report is kept by the foreman, while the carbon duplicate is sent to the office, where it is kept by the bookkeeper.

In order to keep track also of the full history of the trucks, as pictured by repairs, their costs and miscellaneous happenings which have a bearing on the value and ultimate life of the machine, a monthly repair and trouble card is used. The latter is designed like Fig. 4, being 10 by 12 inches, ruled and printed similarly to Fig. 2 and coming in form of pads with duplicate blanks. Every repair is recorded on this form, there being one page—or two or more pages, if necessary—for each car kept in a binder. With the nature of the repair, the cost of the material and parts used are recorded, as is the exact cost of labor spent on the job. Likewise, any trouble which arises, whether requiring a repair or not, is recorded. At the end of the month the foreman signs the report and files it, the duplicate going to the bookkeeper.

The information given on the three forms is compiled on a fourth, the monthly record, Fig. 1. This is a white sheet, 15 by 12 inches, ruled red and blue and printed black. The hours spent outside the company's garage are taken from the checking sheet, and the hours during which the truck traveled are obtained by deducting from this time the standing time given in Fig. 2. The miles traveled are also taken from the latter record. From the amounts of gasoline and oil, Fig. 2, the prices are calculated, while those of new equipment and road repairs are taken direct from that record. Fig. 4 gives the cost of repair jobs whenever they are carried out. A certain amount is charged against each truck daily for garaging. Overhead is calculated in the following manner: After deducting the garage and shop labor accounted for by repairs from the payroll of that department, the remainder of the wages and the salary of the foreman, together with light, heat, power, insurance, etc., are added and divided by the number of cars, the quotient being in turn divided by the number of days in the month. In this way a daily overhead charge is found, which is entered in that column. The day's wages of driver and helper are also recorded. By adding all the money amounts, the total cost of the truck per day is found, and dividing this by the miles traveled, the cost per mile is obtained. Leaving the lost interest and depreciation out of consideration for the reasons of one being not a reasonable charge and the other impossible to calculate exactly in advance, the total cost of the day and that per mile are exact. At the end of the month, all columns are totaled, the form being so designed that the total miles traveled, hours out of the building, hours traveled, total cost for the month and monthly average cost per mile are especially prominent. The bookkeeper who transfers the figures from the other sheets and one who checks his work sign the record.

**In the furniture-moving and storage warehouse business, motor trucks have a chance of developing only one-third of their usefulness, due to the long time lost in loading and unloading them. It is in consequence of this disadvantage that the total cost of operating motor trucks averages from 50c. to 80c. per mile, while that of horse vans of about the same size and carrying capacity is in the neighborhood of 25c. or 30c. Therefore, many companies who now use automobiles only to show that they are keeping pace with the times, do not supplant the bulk of their horses, but would do so as soon as the automobile cost per mile could be brought down to the level of the horse figure.**

**To obtain strictest operating economy, exact records of truck achievements and maintenance expenditures are one of the best means. If the costs are dissected, it is much easier to distinguish between necessary and unnecessary expenses of maintenance than without these details on hand.**

In New York City, the cost per mile of several concerns in the furniture-moving and storage-warehouse fluctuates between 50 and 80 cents, depending on the good care of the truck and the possibility of keeping it moving, while a horse team costs about half that per mile. If it were possible to keep automobiles moving all day, the cost per mile could be brought down to the horse figure or below it, with the result that all horse teams would at once or very quickly be supplanted by motor-driven freight vehicles.

CHECKING SHEET Month of.....191....

| Day | Car No. 1 | | | | Car No. 2 | | | | Car No. 3 | | | | Car No. 4 | | | | Car No. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Out | In | Out | In | Out | In | Out | In | Out | In | Out | In | Out | In | Out | In | Out | In | Out | In |
| 1 | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | |

*Fig. 3—Monthly truck-check sheet*

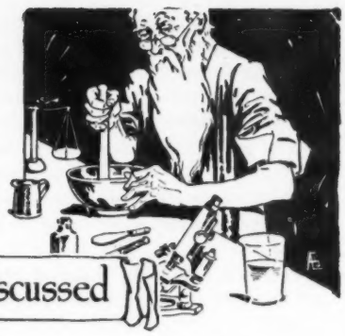
CAR No.. . .. MONTHLY REPAIR AND TROUBLE CARD Month of.....191 ....

| Day | Nature of Repair | Material | $ c. | Labor | $ c. | Day | Trouble |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

....., Foreman

*Fig. 4—Monthly repair and trouble card*

# The Rostrum



In which Letters from Readers are Answered and Discussed

## No Clutch Adjustment on Maxwell Special—Remodelling for a Speedster—Construction of Acetylene Tank—Money for Roads—Adjusting Oil Level—Speed of Electric Vehicle Motors—Criticism of Present Day Body Design

### Cannot Adjust Maxwell Clutch

EDITOR THE AUTOMOBILE:—Would you be so kind as to give me some information on adjusting the clutch on a 1912 Maxwell Special?

We have drained the oil out of the clutch box and washed it out with kerosene, thinking that possibly some of the grease from the gearbox had worked into it, but washing it out did not help matters. We find that the machine will pull all right on low and intermediate gear, but when on high, and a good stiff pull before it, the motor will begin to race and the machine will slow down.

We do not see any way to adjust the spring that holds the clutch in. Is there no way to tighten the spring up so it will throw the clutch in tighter?

New Albany, Ind. FRED KAHLER, JR.

—The 1912 Maxwell Special car used a multiple-disk clutch with a single spring upon which there was no means of adjustment. The spring was made extra heavy and it was thought that adjustment would never be required upon it. There is only one method which suggests itself outside of purchasing a new spring and that is the fitting of a collar between the spring end and the shoulder against which it rests. This would compress the spring slightly and give a stronger contact between the plates. The insertion of cork inserts in the disks would also alleviate your difficulty.

### Increasing Speed of Ford Car

Editor THE AUTOMOBILE:—Please inform me if it is possible to change the gear ratio of a Ford model T in order to obtain a greater speed on level roads?

I am thinking of taking the body off, and my experience has led me to believe that a model T Ford, if the gear ratio is altered and, if possible smaller wheels put on, will attain a speed of 48 miles an hour on the level.

I should also like to know if it is feasible to alter the angle of the steering post and if a longer column could be put in. Also the approximate cost of these two alterations.

New York, N. Y. JULIAN R. SPEYERS.

—In order to change the gear reduction of the Ford model T it would be necessary to have a gear made specially. The Ford T is geared 3 3-11 to 1 on high and if this same ratio is used with 32-inch wheels and the body stripped down, a speed of 60 miles an hour is possible. In fact a couple of years ago, a Ford car similarly equipped with a high-tension magneto added made 65 miles an hour on the Brighton Beach track. It is not necessary to change the magneto.

In changing the rake of the steering column it will be necessary if you have a 1912 model or a touring model of any year, to put in a 1911 torpedo steering column. The price of the new steering column is $20.

### Asbestos in Acetylene Tanks

Editor THE AUTOMOBILE:—1—What per cent. of acetone and asbestos does the Prest-O-Lite Co. use in its gas tanks to keep them from exploding?

2—Do the overhead valves (as in the Buick) give more power than the inclosed valves?

3—Do iron and steel crystallize?

Norma, Neb. ELMER S. SMITH.

—1—In the style B Prest-O-Lite tanks, which have a capacity of 40 cubic feet of acetylene gas, there are 4.5 pounds of acetone. The acetone absorbs the acetylene gas. The tanks are completely filled with asbestos and the gas is contained in the pores of the asbestos. Very little, if any, of the acetone escapes with the gas so that it is not necessary to replace much of it. The Prest-O-Lite company stencils each tank with its weight when containing the acetone and the asbestos. When the tank is exhausted and returned to the factory it is weighed and any difference in weight represents a loss of acetone because there is no chance whatever of the asbestos getting away. The empty Prest-O-Lite tanks of the style B, of 40 cubic feet capacity, weigh between 25 and 30 pounds, 28 pounds being a good average. Acetylene weighs 14.4 cubic feet to the pound, so that in the 40-cubic-foot tank the difference in weight between a filled and an empty tank is a little less than 3 pounds.

2—The advantages and disadvantages of overhead valves have often been discussed in these columns. It is generally conceded that, owing to the more advantageous shape of the combustion space with overhead valves, the latter furnishes a more powerful engine. On the other hand, motors having valves of this kind are hampered by a more complicated valve mechanism and hence one which is more difficult to keep silent. It is a matter of pick and choose and the intending purchaser will be able to listen to perfectly reasonable arguments from salesmen of both types of engines.

3—The term crystallization is rather vague, but in the general acceptance of the term in implying intermolecular disintegration under repeated shock and alternating strains and stresses, iron and steel do crystallize. There is a crystal-like appearance to a section under fracture after the elastic limit has been materially reduced.

### Spark Plugs and Roads Discussed

Editor THE AUTOMOBILE:—From the number of patents for different types of spark-plugs, and the strenuous claims of the makers, it would seem the efficient spark-plug had not yet arrived. Making engine and carbureter experiments, I produced an awful fouling mixture, and using various plugs, fouled them from 3 hours' running and up until I struck the type like the sketch, Fig. 1. This type stands more oil than any I have come across. The bolt on the upper side of the shoulder or collar is

wrapped with asbestos, is put into the porcelain and held by a nut on top, the asbestos fitting snugly into the taper in the porcelain makes a gas-tight fit. The porcelain is then put into the nut, the inside of the nut above the thread, has a taper, the outside face of the porcelain collar has also a taper and when they are put together make a wrapped opening. This is filled with asbestos and is then screwed into the bushing and the spark-gap adjusted.

When there is an excess of oil or fuel, from poor carburetion, there is a film of oil deposited on the walls of the cylinder, spark-plugs, etc., the flame not getting between the film and the metal surface only a portion of the outside surface is burned off, a residue remains and absorbs some of the dense smoke, etc., forming carbon deposit, making a path for more or less current and making a short-circuit.

The asbestos being a fuzzy composition has no hard surface, consequently the flame can get back of the oil film, the asbestos acting as a sort of wick, the oil is more readily burned up and keeps the asbestos clear. Since it is a non-conductor, and presents greater resistance than the spark gap, you get the hot spark by the current all going by the gap. Through time, standing, etc., the asbestos may get soaked; it can then be taken apart and new asbestos put in and is as good as a new plug.

This plug was put in oil and sparked, taken out, wiped off, put in a Ford car, and ran several weeks. It was then taken out and put in a ton truck and gave the best of service. I have repeatedly fed an excess of oil until it dripped from the exhaust pipe, but it never feazed this plug. Those who have spark troubles can verify this by giving this plug a trial. It gives a white hot spark. A blue spark indicates a short circuit needs renewal asbestos with battery. One point gives hotter spark than two or three.

## The Road Question

The road question now being in the lime-light, a recent editorial in THE AUTOMOBILE made a few rather pointed remarks about the farmer. It would only be fair to get the view of the farmer. Farming is no get-rich-quick scheme. Nature has certain laws the farmer has to go by; hence he is naturally conservative. At a farmer's institute I once attended there was a speaker advocating road improvement by bond issue. He had an apathetical disinterested audience who all felt he was only the mouthpiece of monied man seeking a safe investment for surplus money (the motive and only reason for all bond issues), as bonds meant interest and interest meant increased taxes. Then a farmer got up and said, "roads were the avenues of commerce and that it was unjust to ask the farmers to bear the brunt of that commerce, and the bond issue was only another phase of the present system. There was not enough money now for a cash business and road building would be a new business. There should be new money made and suitably appropriated by the government." Instantly every farmer was a spirited and interested listener, the bond issue man alone looking cross-grained. Briefly the idea was to repeal free coinage, demonetize gold and silver subsidiary coin. The 50-cent piece was to be made of hardened aluminum, the dollars to be made greenbacks without exception; and were to be appropriated to the different states as required, as the mint was a co-operative institution. It being built by the people's money and taxes, it was operated and maintained by the people's money and taxes. Consequently the products belonged to the people, and an owner has the right to the directing of the use and disposition of his property; an unanswerable argument. In less than seventeen years the interest consumes the principal of $100 put out at 6 per cent. It takes it out of circulation, unless new money is put into circulation by the government (no loans); property has to be taken for the principal. This leads to concentration of wealth and no money in the hands of the common people—the trouble with the road question today.

The enormous invested capital of the United States demands such government appropriation to check the ever-increasing concentration of wealth or else abolish interest entirely by establishing government banks or chaos, the lop-sided agitation of government reform, of socialists, prohibitionists, single taxers, etc., adding to the confusion. The assumed privileges of immense wealth is creating such disrespect of law that there is danger of realizing Abe Lincoln's prophecy, the life of the Republic meeting the fate of the ancient Roman empire.

## Transcontinental Pike

Take, for instance, the transcontinental pike movement; consider it a moment. Isn't it a thing of great national interest and benefit? Why build it by subscription? Isn't that a retrograde movement? From civilization, organized ability to individual effort like primitive man, the very suggestion seems to savor of hasty impulses, a sort of a lack of comprehension of governmental prerogatives and a magnitude of intellectual decline.

Why not make use of the years of learning and experience and go at it with the organized ability of unlimited government resources and build such a road of efficiency and durability that future ages would point to it as a great feat of accomplishment? Why not assume your sovereignty, instruct your hired men—Congress—to authorize the making and appropriate the amount of greenbacks for the construction of a road of minimum grades and curves, a solid foundation, surfaced with the best vitrolized brick or the best material that science could produce—an ocean-to-ocean road, 100 feet wide, no difference what the cost, whether $50,000,000 or $100,000,000? The mint is there, the operators are being paid, and it is not going to increase cost to turn this money out. We would then have grand roads, and no individual, however humble, would feel an oppression of the burden to the weight of a hair, while it would put money into the hands of the common people who want automobiles and so stimulate the trade that it woud dispense with the present style of strenuous advertisement of the makers and enable them to view Judgment Day with greater equanimity.

If any Pennsylvanian thinks the statement disrespect for law or a pipe-dream he has only to get a copy of his State's constitution and Webster's Unabridged Dictionary to brighten up his so-called education. Read the first article of that constitution, take his dictionary and get the literal meaning of the words used and he will see that the law practically says that a man who discredits time-honored custom and buys an automobile—the deadly menace to life and society—is an anarchist, imposes an annual fine on him, gives him a number as a ticket-of-leave man, scorning the custom of his forefathers—human locomotion by two legs. He must be tabulated like a prize dog at a poodle show or forfeit his liberty. Yet autoists generally considered as representing the better class submit with the same docility as any other boob. The ignorance of the money question is the barrier to civilized motoring. It will require a fine, more subtle knowledge than of the motor, ere realizing Bobby Burns' "Man to man will brother be for a' that."

Bradenville, Pa. JOS. MUNDEN.

## Fan in Intake Manifold

Editor THE AUTOMOBILE:—Please state the advantages and disadvantages of a revolving fan in the intake manifold. Will it prevent the motor from getting a full charge of gas on high speeds with the throttle wide open?

Ithaca, N. Y. R. A. FREAR.

—It is generally the opinion that the revolving fans or other devices in the intake manifold do decrease the volumetric efficiency of the motor to some extent by increasing the friction in the manifold and hence cutting down the

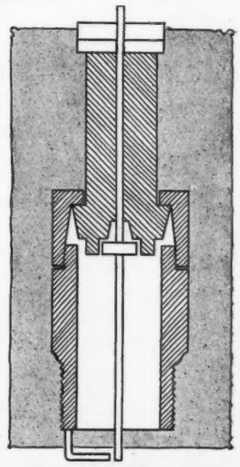


Fig. 1—Type of plug said to possess non-fouling qualities, owing to its method of construction and the material used in making different parts

amount of charge entering the cylinder. When the carbuetion is poor and the atomization of the fuel is bad, the fan or other device will act to break up the globules. In other words a device of this kind will help out a poor carbureter by breaking up the fuel. The decrease in volumetric efficiency is a slight consideration because the motor is seldom run at the full power and the difference would not be noticeable. It must be remembered that only a comparatively low horsepower is used on the road.

The difficulties of good carburetion are increased because of the low grade fuel now on the market. With .58 gasoline we cannot get the same rapidity of vaporization as we could with .65. When the motor is running very slowly, it is hard to break this heavy gasoline up into a fine spray and it is also very hard to vaporize it perfectly. Under these circumstances the fan or other device in the intake manifold will do its best work and give the most beneficial results.

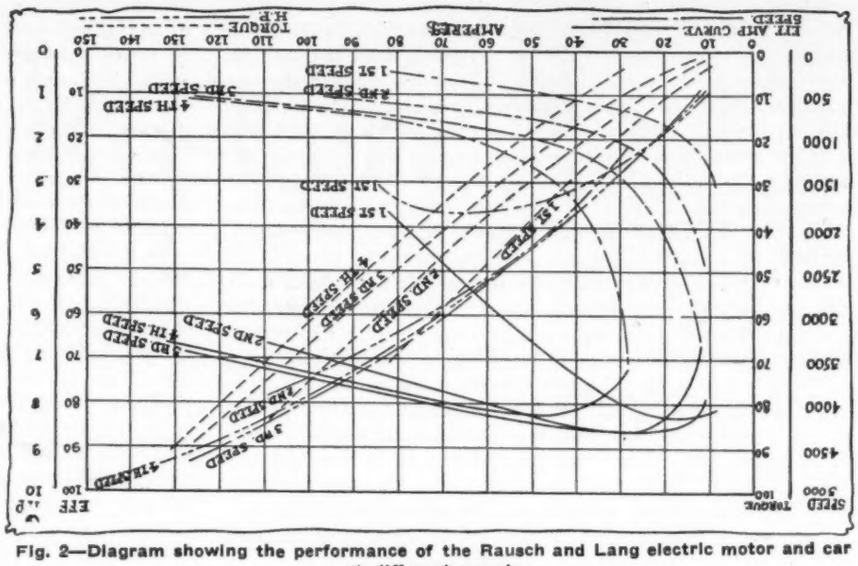



Fig. 2—Diagram showing the performance of the Rausch and Lang electric motor and car at different speeds

## Dip of Splash Lubricating Scoops

Editor THE AUTOMOBILE:—1—About how much dip would the scoops have in the oil of a motor, four-cylinder, four-cycle, 2.5-inch bore, 3-inch stroke, same classed as high-speed motor, using a vacuum splash system of oiling?

2—What is the gear ratio of the Ford model T, 1912, 1913?

3—What motor did the Hudson company use in the "33" model?

4—What motor does the Dorris use at the present time? Is it their own?

Fairfax, Mo. A. L. CARTER, JR.

—1—The dip of the connecting-rod scoop should be 1-8 inch.

2—The gear ratio is 3 3-11 to 1 for both years.

3—The Hudson company used their own design of motor. No other concern uses the same design.

4—The Dorris company uses their own motor. It is of the valve-in-head type with the cylinders cast in pairs.

## Information on Electric Vehicles

Editor THE AUTOMOBILE—Will you kindly let me have the following information in reference to the motors used on electric cars?

1—Name the revolutions per minute at the different speeds from 4 to 25 miles per hour. State the amount of current consumed in amperes at these speeds.

2—What is the type of motor used; also the voltage at which the motor is run?

3—The capacity of the batteries, volts and amperes.

Newark, N. J. EDWARD FALK.

—The answers to the questions you ask would vary for different makes of vehicles. A few representative makes are considered and the answers as applying to them are given herewith under the name of each vehicle.

### Anderson

1—Speed and revolutions of the car and the motor are given in the following table:

| Controller Position | Miles per Hour | Revolutions per Minute of Wheel | Revolutions per Minute of Motor | Current at Volts | |
|---|---|---|---|---|---|
| 2 | 8 | 79.1 | 389 | 10 | 40 volts |
| 3 | 13 | 128.6 | 633 | 18 | 40 volts |
| 4 | 17 | 168.1 | 828 | 30 | 80 volts |
| 5 | 20 | 197.8 | 972 | 39 | 80 volts |

2—Part of this question is answered under answer 1, as regards the type of motor; this is of the straight series wound type.

3—With lead battery 140 ampere hours, Edison battery 100 ampere hours. The gear reduction is 1:4.92.

### Argo

1—The Argo car is geared so that the motor turns 77 revolutions per minute for each mile an hour of the car. This gives the following results:

4 miles per hour— 308 revolutions per minute.
10 miles per hour— 770 revolutions per minute.
15 miles per hour—1150 revolutions per minute.
20 miles per hour—1540 revolutions per minute.
25 miles per hour—1920 revolutions per minute.

The current drawn from each cell of battery for the above speeds will be as follows: 20, 20, 25, 38 and 55 amperes, respectively.

2 and 3—The motor is of the four-pole series wound type, operating at 80 volts, and the rated capacity of the storage battery is 138 ampere hours; and we have found in our car, will average from 160 to 180 ampere hours in normal city running.

### Borland-Grannis

1—The number of revolutions per minute at different car speeds from four to twenty-five miles an hour is best answered by stating that the motor which issued is rated at 1200 revolutions per minute, and at this rate at four miles per hour, the revolutions per minute would be about 55.5, and at twenty-five miles an hour, 1387 revolutions per minute.

2—The winding of motor is series-parallel. The voltage of the motor is 85.

3—The capacity of storage battery in ampere hours is 112 for the 40 cells of 9 M. V., and 137 1-2 hours for 40 cells of 11 M. V. Hycap. These two battery equipments are optional in most of our models.

### Brock

1—Revolutions per minute at 25 miles an hour is 1711.5, and reduction of speeds is correspondingly, that is, at 5 miles an hour, which is one-fifth of 25 miles, will be one-fifth of the revolutions per minute, or 342.7. Other speeds, of course, are in proportion.

2—Type of winding used on motor is shunt. Voltage of motor, 80 volts.

3—Capacity of storage battery in ampere-hours; 137 1-2 ampere hours, and capable of giving even better under right conditions. The performance of the car is as follows:

| Speed | Revolutions per Minute | Miles per hour | Current Consumed | Watts Consumed |
|---|---|---|---|---|
| 5th | 1708 | 25 | 45 amperes | 3600 watts |
| 4th | 1400 | 21 | 30 amperes | 2400 watts |
| 3d | 1116 | 16 | 20 amperes | 1600 watts |
| 2d | 686 | 10 | 15 amperes | 600 watts |
| 1st | 350 | 5 | 10 amperes | 400 watts |

### Church-Field

1—The revolutions per minute at any speed may be deduced

from the fact that the reduction from motor to wheel is 4-1 on direct and 8-1 on low gear, and the diameter of the wheels is 36 inches. This gives 34.3 revolutions per mile an hour.

2—The motor is series wound and the speed is controlled by a variable shunt resistance connected across the field terminals. There is no fixed current at any given speed of motor, i. e., at 800 revolutions per minute the motor might draw 22 amperes or 200 amperes, depending upon the amount of shunt resistance in circuit and torque required. A speed curve for each point of control would be necessary to answer this question. The motor operates at 48 volts.

3—204 ampere hours at 40.8 amperes is the battery rating.

### Ohio

1—The motor revolves 160 revolutions at 4 miles per hour; 1000 revolutions at 25 miles per hour. The current consumption, 30 amperes at 810 revolutions 75 volts.

2—The motor is a series wound motor. Voltage of motor 75.

3—Battery capacity in ampere hours is 178.5.

### Rausch & Lang

The number of revolutions per minute of the motor may be found by multiplying the miles per hour by 88. Thus at 10 M. P. H. the motor speed is 880.

The motor is over wound and has a set of small shunt coils used to get the electric braking effect and to get a steep torque curve on the high speed position.

The current consumed at various rotative speeds can best be got off the accompanying curve, Fig. 2.

The motor is wound for 80 volts and is used on 40, 41 and 42-cell equipments of 11 M. V. Hycap batteries or their equivalents.

## Criticism of American Body Design

Editor THE AUTOMOBILE:—Within the last few years great improvements, both in comfort and appearance, have been made in American motor car bodies. When compared with the latest foreign products, however, the stock bodies fitted on 1913 models by some of our foremost car manufacturers leave much to be desired. It may be maintained that this is but natural, considering that abroad almost all high-class firms have the body work built for their cars by specialists.

Manufacturers of high-grade American cars would be even more successful in competing with the foreign product on home soil if they gave more attention to coach work. At present an owner who wishes a presentable open touring body has to scrap the stock body (or is allowed a ridiculously small allowance for it) and sends the chassis to a coachbuilder to whom he has to pay from $1,200 to $1,800. If the manufacturer would only collaborate with a good body builder and give the purchaser some latitude in regard to his personal desires, the resulting body would be just as comfortable and pleasing to the eye as one built to order.

One of the most obvious points in designing a touring body is the desirability of merging the hood into the body. Yet, how many products of our high-class firms embody this feature? In almost every case we find a sharp line of demarcation between the hood and the body, either as a dashboard exposing an ugly reveal above and on either side of the hood, or as a convex cowl, serving equally well to destroy the smooth sweep from fore to aft so essential to beauty. When will more American manufacturers learn that the smooth and easy transition between hood and body can be effected by tapering the hood and properly treating the dash?

In very few cases is the projection of the top in front of the windshield sufficient. As a rule there is a space between the windshield and top just large enough to allow the rain to drift in and thoroughly wet the occupants. When certain tops are up, it is dangerous to enter the front seat, as one's head is almost certain to come in violent contact with the strut running from a point about half way up the vertical post to the front of the top.

Much has been done recently towards clearing up the running boards and not making them the receptacle for tool and battery boxes, luggage, generators, gas tanks, etc., but there still is room for improvement in this respect. If spare tires must be carried on the running board why are they not sunk several inches in it, so that they will not project above the sides of the body, thus impairing the appearance of the car?

Among the popular double-compartment limousines there are many examples of poor design. In the first place the sudden transition between hood and body produces an even more unpleasing effect than in an open car. Also many of these limousines resemble two independent bodies joined together. This peculiar broken appearance is due largely to the fact that the window-sill line is not carried on the same level throughout, being lower around the front seats than the rear compartment. The whole effect is singularly ponderous, many of these bodies looking as if they weighed tons.

Perhaps the most important novelty in coachwork disclosed at the motor-car shows held this season was the single-compartment body or, as it is generally termed, the sedan. Since this is perhaps the most difficult type of body to design it is not astonishing that very few satisfactory examples have as yet been produced in America. In many cases a compromise between the true single-compartment body and the limousine has been attempted with rather unhappy results. The body illustrated herewith has no partition between the driver and passengers.

One of the objects in designing this body was to reduce the wind resistance as much as possible. To this end the cowl dash forms a continuation of the bonnet, there being no reveal whatever on either side of the hood. The upward flare of the dash, the downward sweep of the roof and the narrowness of the body in front leave very little surface normal to the direction of travel.

The shape of the rear which is almost semi-spherical, reduces the vacuum behind the car, thus minimizing the dust. A segment of the back swings open, giving access to a circular recess for the spare wheel. This arrangement is ideal as the extra wheel is completely protected from the elements and does not mar the appearance of the car.

Some of the dimensions given in inches are as follows:

| | |
|---|---|
| Wheelbase | 136 |
| Ground to top of frame | 24 |
| Width of frame | 36 |
| Dash to back of frame | 108 |
| Dash to front of forward seats | 29 |
| Depth of forward seats | 17 |
| Back of forward seats to front of rear seats | 27½ |
| Depth of rear seats | 19 |
| Height of all seats from floor | 13½ |
| Height of body, inside | 56 |
| Width of doors | 24 |
| Height of doors | 51 |

New York City. JOHN JAY IDE.

## A Mistake in Mathematics

Last week The Rostrum published a letter signed by E. W. in answer to which it was stated that the speed of two similar cars would vary as the square of the wheel diameters. This should have read, as the wheel diameters. The car with the 34-inch wheels would travel 1.0625 times as fast as the car with the 32-inch wheels.—ED.

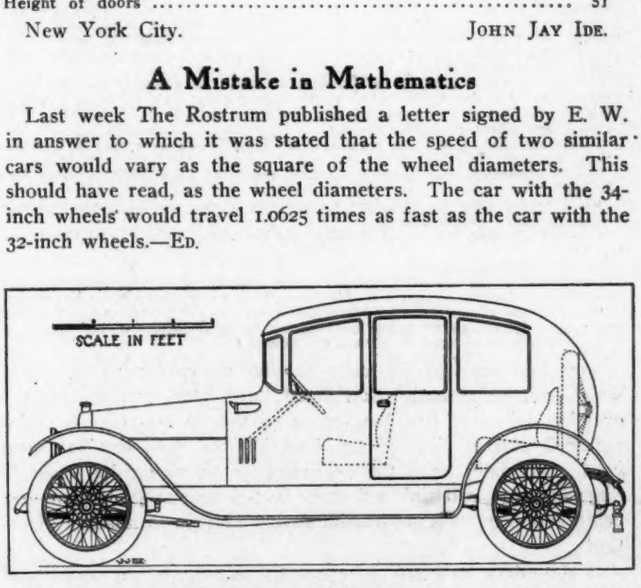



Fig. 3—Suggested lines of a single compartment car with body designed for minimum wind resistance

# Dynamometers vs. Road-Testing

## Metropolitan Section of the S.A.E. Hears Paper Read by P. P. Dean on Laboratory Chassis Testing Methods and Apparatus

NEW YORK CITY, April 24—At a meeting of the Metropolitan Section of the Society of Automobile Engineers held here, P. P. Dean, of the Diehl Dynamometer Mfg. Co., read a paper on Chassis Testing Apparatus. The idea of the paper was to bring out discussion which would shed light on the possibilities of supplanting a large part of the road testing by stationary work. Many of the small towns about Detroit are passing laws forbidding the cars of the testers to pass within their corporate limits at high speed and the work of the testers is hampered at all times by legal processes. Mr. Dean said in part:

The commercial testing of the finished chassis whereby accurate measurements may be taken seems to have received very little attention in this country, many engineers being of the opinion that it is unnecessary to keep any records or take any such measurements.

### Road Test Is Not Sufficient

It is claimed by some that a good road test cannot be improved upon, such a trial providing all conditions that a car in actual use will meet, but I believe that the time has come to look more closely into this, both from a technical and commercial standpoint.

While the majority of engineers admit the stationary test to be ideal, supplemented, of course, by a short road run, they claim that the price of a good rear wheel equipment is against manufacturers adopting them in sufficient quantities to eliminate road testing altogether, and there is not to my knowledge a single concern offering a real good and complete commercial equipment for rear wheel testing at a reasonable price.

The advantages claimed for stationary over road testing are:

1—Actual measurement of horsepower at rear wheels. Loss in drive from wheels to brake is negligible and cannot be readily separated.
2—Speed in miles per hour at any load may be measured, also revolutions of engine.
3—The chassis may be loaded to its maximum capacity, both in horsepower and speed, a limit of say 70 miles per hour being established on account of the speed of the driving chains.
4—The maximum power available may be absorbed through either first, second, third or fourth gear and reverse, through any length of time.
5—Transmission gear may be noted under full load operation as to noise, lubrication, ease of shift, etc.
6—The slightest increase or decrease in power developed, by carbureter adjustment, may be easily noted on the horsepower motor, while running. This also applies to spark setting, and is important.
7—Actual effect of muffler cut-out.
8—Actual load, speed and time of test, limited only by ability of reciprocating parts to stand strain.
9—No abnormal road speed necessary, therefore possibility of speed fine eliminated.
10—One operator can test four or five chassis at once and keep accurate record of every measurement.
11—Actual consumption of gasoline under any condition may be ascertained.
12—No tire expense.
13—Every important part except springs may be watched under full load conditions. Complete record on file for reference or prospective purchaser.
14—The above mentioned observations may be made when using an electric cradle dynamometer, some modification being necessary in the event of a water brake being used to absorb the power.

Now that some of the many possible measurements and facts which can be actually ascertained have been enumerated, the question arises of just how much of this information is really required, and in view of the fact that the road test has been used continually since the beginning, it seems hardly probable that engineers will sink a fortune in testing stands without first being confident of a substantial saving or gain in another direction.

If stationary tests are to be adopted in place of the usual road trials, at least a dozen equipments would have to be installed, but this number would, of course, depend upon the factory output, so that first cost of the installation is a considerable item. The kind of apparatus would depend upon the accuracy of the measurements required, *i. e.*, if actual rear wheel horsepower is desired, either an electric or hydraulic dynamometer is required, and even then the driving chain loss cannot readily be separated.

A fair comparison of the cost of the three methods mentioned of a single equipment designed to take care of 50 horsepower at rear wheels would be as follows:

| | |
|---|---|
| Hydraulic dynamometer dynamo | $ 900.00 |
| Electric dynamometer | 1,400.00 |

Including all speedometers, measuring instruments and chains but without stands and universal joints.

Against this first cost recognition has got to be taken of the saving of time effected, saving of tires, quality of the results, and facilities for observations not possible while he car is in motion.

The apparatus described by Mr. Dean was illustrated in THE AUTOMOBILE for March 13.

The discussion on the paper did not bring to light any new facts, the attitude of the members showing some skepticism as to the value of a laboratory test as compared to an actual test on the road. Morris Machol asked if the racking and twisting strains on the chassis and its consequent effect on the running gear of the car could be duplicated in such a test.

Mr. McMurtry stated that the value of being able to make the proper carbureter adjustments and ignition, timing, etc., would be great in an installation of this kind. He estimated that 60 per cent. of the road tests could be eliminated.

Professor Marshall stated that one of the great drawbacks in the laboratory methods of testing was the fact that the wind resistance was not taken into account and that this could amount to as much as 20 per cent. at the higher speed of the total resistance of the car. The losses through the tires also are an important factor and cannot be gauged by a chassis testing outfit.

## English Trucks May Transport Gasoline

LONDON, ENG., April 22—It was 3 years ago that the Home Office Departmental Committee appointed to inquire into the sufficiency of the regulations relating to the storage of gasoline and the conveyance of it in bulk was issued. In this report the committee recommended that all road tank wagons for the conveyance of gasoline should be horse-drawn. Acting upon later evidence, however, the committee have just published their final report, in which it states that mechanically-propelled wagons should not be prohibited, providing that they are properly constructed for the purpose, and built to regulations.

Whether the recommendations should prove to be any benefit to the motorist if carried out seems doubtful, for there are no measures recommended that will tend to reduce the price of the spirit. With regard to the prohibition of tank steamers to proceed above Thameshaven, by the Port of London Authority, the committee find no reason for this attitude, which does undoubtedly affect the price of imported gasoline as much more handling than is necessary takes place, which only means expense, and should the boats be allowed to travel further up the Thames before unloading the spirit it would greatly facilitate distribution, and have a tendency to reduce the price.

# Resuscitating a Dead Storage Battery

## Sometimes the Generator Is at Fault—Investigate for Imperfect Switches, Sockets and Wiring—Use Plenty of Distilled Water

CLEVELAND, O.—Editor THE AUTOMOBILE:—The almost universal adoption, by car manufacturers, of electric lighting and starting systems, has necessitated the use of storage batteries to an extent never before reached.

The storage battery, properly handled, is a most efficient and uncomplaining servant, but like a good watch or any piece of machinery, it is neither trouble nor fool proof and will suffer from lack of care or unintelligent handling.

Storage battery ailments are very few, but as the most annoying one is a so-called dead battery; the following instructions for its resuscitation may prove of benefit to users:

Should your battery become dead, first ascertain if the generator is putting up its proper amount of current; a storage battery is not a creator of energy and depends for its supply upon the generator, which is driven by the engine.

If you find your battery dead at any time, introduce an ammeter in the battery circuit and see how much current is being delivered by the generator at different speeds—8, 12, 16 and 20 miles per hour. A generator properly built will furnish at least 10 amperes at 12 miles per hour. If you are only getting 7 amperes at this speed the generator should be adjusted to give its full output.

When a storage battery is allowed to fall behind, it will not store the energy supplied by the generator even though the latter is giving its output, for the reason that the battery has gotten into a stale condition and does not properly take a charge.

If investigation shows that the generator has not been giving its rated output, and the battery has fallen behind, it should be taken to a garage and charged according to directions given on the battery name plate. Adjust the generator so that it delivers the output claimed by the manufacturer of the car or generator; put the battery back into service, and, as long as the generator gives its output there will be no lack of light or power for starting.

### Value of Ammeter on Dash

Some manufacturers furnish with their apparatus, an ammeter, which is placed on the dash of the car and shows the amount of current passing into the battery. This is very desirable as it indicates whether there is any interruption of current due to any cause whatever and also whether the generator is giving its full output.

Some manufacturers leave this instrument off the car as a matter of economy, but it will be readily understood how valuable this kind of an instrument is when consideration is given to the fact that a battery may become dead and possibly ruined by lack of knowledge of conditions existing in the generator.

Faulty lamp sockets may also cause a storage battery to lose its current. After proceeding as above, if the cause of your trouble has not been located, examine your lamp sockets and look for looseness and poor contacts, which should be corrected at once.

Investigate the switches in both the lighting and starting circuits and make sure that they return properly to the "Off" position when current is not being used.

Ascertain whether your wires are in good condition. Look for places where the insulation may be worn off from friction, where wires rub against the frame or other metal parts of the car.

Inspect your lamps to determine whether or not your battery is overloaded. The total candlepower of lamps used should be in proportion to the capacity of the battery and if you are using more than you should, get lamps of the proper candlepower.

All parts of your lighting and starting systems being right, remember that if you operate your car mostly at night, when lights are all on, and very little in daytime, you are not giving your generator opportunity to do its work and a dead battery resulting from this cause shows no fault either in generator or battery. To avoid this condition when car is used mostly at night, economize on your lighting when possible and run your engine a while each day to fill up the battery.

Last, but not least, don't neglect keeping your battery well filled with distilled water. Remove vent plugs once a week and see whether plates are covered with solution to the depth of at least 1-2 inch. If not, add pure water, never anything else. This is important, as nothing will more certainly insure loss of capacity and final ruin of a storage battery than allowing the plates to become dry.—C. BARRELL, Willard Storage Battery Co.

## Detecting Resistance—Saving Fuel

(*Continued from page 939*)

The curves B, C and D show the increased resistance offered by 5, 10 and 14 per cent. grades.

The vertical distance between the curves (A) and (1) shows the capacity of the motor to accelerate the car on a level road. At 20 miles per hour the motor can exert at the clutch a force equivalent to 147 pounds per ton, which will produce an acceleration of 2.37 feet per second.

At 40 miles per hour the acceleration will be 1.36 feet per second.

If the car begins to ascend a 5 per cent. grade the force available for acceleration will be reduced by the force necessary to mount the grade. As this is 100 pounds per ton, the force available at 20 miles per hour will only be 47 pounds, which will produce an acceleration of 0.75 feet per second.

The acceleration decreases with increased speed until the resistance and torque curves cross, when the car will run at a uniform and maximum speed.

Thus on the fourth speed the maximum velocity will be between 50 and 55 miles per hour on a level macadam road.

The maximum speed obtainable on a 5 per cent. up grade is 37 miles on fourth gear. The maximum grade surmountable on the fourth gear would probably be about 7 per cent. and that at a speed of 15 miles per hour.

Shifting gears to third would raise the accelerating power at 15 miles per hour on a 7 per cent. grade. The power at the clutch would be increased 150 pounds per ton—a large enough amount to accelerate the car 2.4 feet per second.

The speed of the car could be increased to about 35 miles per hour on this gear and grade.

On a 10 per cent. grade the resistance curve (C) for this grade crosses the third speed torque curve at 31 miles per hour, which will be the maximum speed obtainable at that gear ratio and power.

By drawing the resistance curve for any grade whatever we can determine what gear can be used on this grade and what will be the probable limit of car speed.

(*To Be Continued*)

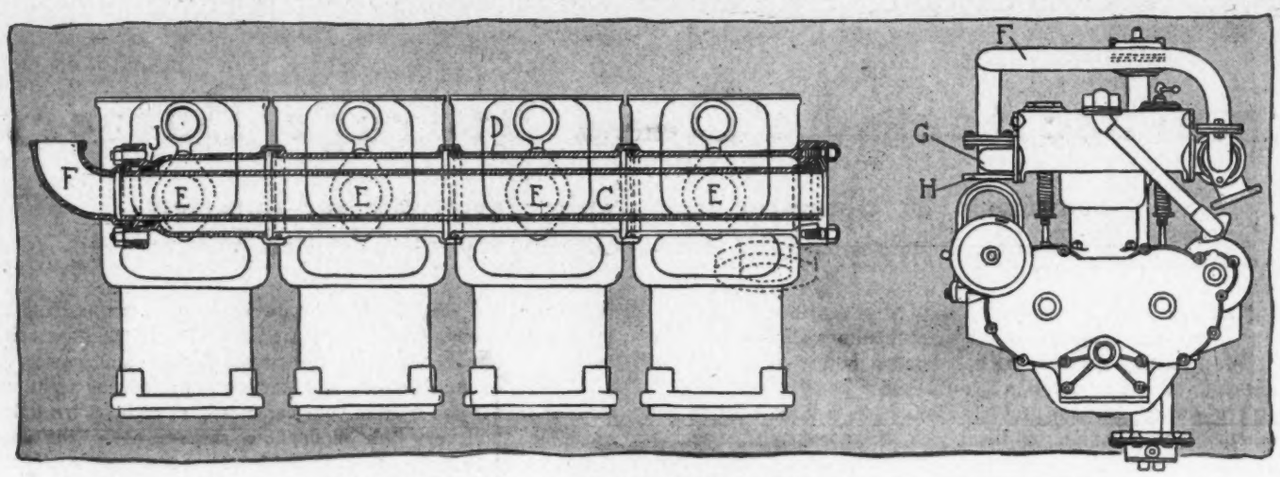



Fig. 1—Elevation and end view of engine fitted with the White and Poppe paraffin system

# Paraffin as a Fuel

## Heat Necessary To Make Vaporization Sufficiently Complete

THE chief reason why paraffin cannot be used in ordinary motor car engines with existing carbureters is that considerably more heat is required to convert the paraffin into vapor than is the case with gasoline. The same applies in a smaller degree to benzole and other fuels heavier than gasoline but lighter than paraffin, although many gasoline carbureters can deal with these fuels, but not with paraffin unless this is mixed with a lighter fuel.

In the White and Poppe system, which is illustrated in Fig. 1, an ordinary White and Poppe gasoline carbureter is arranged, delivering the mixture through an elbow to the vaporizer pipe C. This passes through the exhaust branch D, to which the exhaust gases are admitted from the cylinders through the four openings E. The fresh gas passes out from the vaporizer tube C by the pipe F to the ordinary induction pipe G, which is arranged in this case on the opposite side from the exhaust branch, and is often fitted with an additional carbureter which is bolted up to the flange H. The supplementary carbureter which is attached at H supplies the inlet pipe with gasoline vapor in the ordinary way, the carbureter A being used for paraffin.

To start up, the gasoline carbureter is used until the vaporizer is sufficiently heated. It is not essential that there should be two carbureters, as one single carbureter can be used, being first supplied with gasoline and then with paraffin. On one car fitted with this system, of which I have had a little experience, the gasoline carbureter was shut off after 2 or 3 miles running, and the paraffin carbureter was then used. By this time the vaporizer was sufficiently hot to gasify the liquid paraffin. As far as one could tell, precisely the same results were obtained with paraffin as with gasoline, and this system is being used on Dennis motor lorries as well as on certain private cars. It is applicable in different ways to suit different types of White and Poppe engines.

The manner in which the objections referred to are overcome is somewhat ingenious. It will be noted that the walls of the vaporizer pipe C are very thick, and the pipe is made of some metal of high heat conductivity, such as copper, and is rigidly attached at one end and held in an expansion joint J at the other. This thick copper tube is therefore free to expand, and, being thick, it retains the heat a considerable time, so that when once heated up the engine can be run slowly for long periods without failure of the vaporizer. Similarly, if the engine be raced for any length of time the thick copper pipe does not become excessively hot near the exhaust ports E, and firing of the paraffin vapor is prevented.

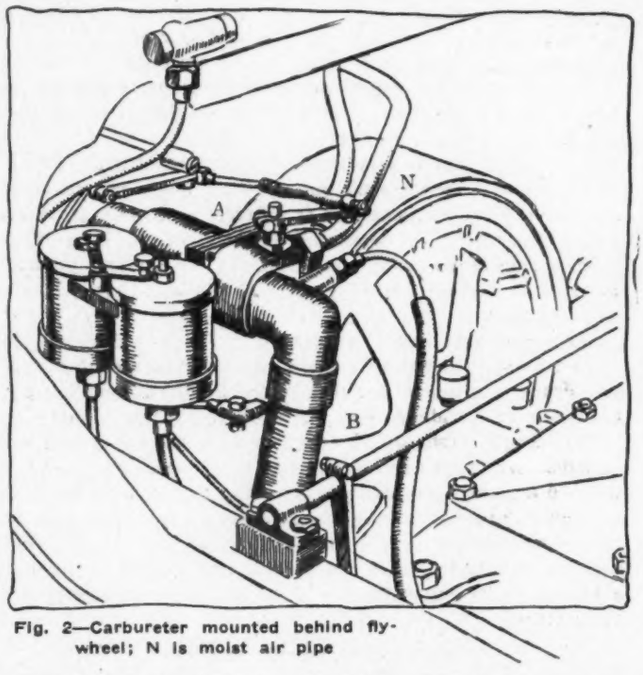



Fig. 2—Carbureter mounted behind flywheel; N is moist air pipe

I have been afforded an opportunity of examining the condition of the pistons and valves of a 28-horsepower Dennis lorry to which the device is fitted. The valves after 1,500 miles running showed no signs of pitting, and the valve heads and piston heads were covered with a slight deposit of fine soft carbon quite different in texture from the usual thick, hard, caked carbon experienced after running on gasoline. The interior of the main supply pipe running through the heater was quite clean, and the oil which had been drained from the crankcase had no smell of paraffin.

It is possible to start without the use of gasoline, as openings are made in the exhaust branch so that a lamp or heater can be used to warm the vaporizer.

Another system is the Halliday paraffin carbureter, which is handled by the Winchester Carbureter Co., 11 Gresham street, London, E. C., and is arranged in a somewhat similar manner to the White and Poppe, but differs in many respects. Fig. 2 is a typical illustration taken from a demonstration car which has been running successfully for many months. It will be seen that the carbureter is arranged just behind the dashboard, and is supplied with hot air from the exhaust box by the pipe

B. It delivers its mixture into a vaporizing tube contained within the main exhaust branch, and the vapor passes off by a vapor pipe to an induction pipe on the other side of the engine. Just before the gas enters the induction pipe it has added to it a small quantity of moist hot air, which is supplied in a manner described hereafter. The carbureter is provided with two float chambers fed with gasoline and paraffin respectively, and from these either fuel is supplied to a jet nozzle which stands vertically in the spraying chamber. A two-way tap beneath the jet nozzle controls the feed of fuel to the jet. Surrounding the choke tube is an automatic air inlet valve and a slow-running by-pass is used, these parts being substantially such as are used in ordinary gasoline carbureters. The lever controlling the two-way tap is coupled to a corresponding lever on the spindle of the water tap. This tap controls the admission of water from the water inlet pipe M to an ordinary jet nozzle. Around this jet nozzle air is drawn from the hot-air pipe passing out through the moist air outlet N, shown in Fig. 2. The quantity of moist air is exactly controlled by the lever which is coupled to the main throttle lever, so that as the throttle is opened more moist air is supplied, and *vice versa*. The control of moist air is, therefore, automatic, and follows the movement of the throttle, and the turning on or off of the water is coupled with the manipulation of the two-way tap. When gasoline is used the water supply is cut off, being supplied only with paraffin.

The vaporizer itself is of rather peculiar construction. At each side of the vapor pipe is provided a rib which forms a partition preventing the passage of the exhaust gas from one side of the pipe to the other except through the cross tubes. These cross tubes are arranged spirally, and they taper throughout their length. In the vapor pipe they constitute a spiral baffle which breaks up the gas as it passes through the vaporizer, so that ample heating is obtained at low engine speeds.

Those who have had much experience of paraffin in ordinary vertical engines have probably found trouble with their main engine bearings. In fact, with the two-stroke engine referred to three months' running was sufficient to wear out a big end bearing. The reason for this may be that during the last few revolutions, after the engine is switched off, paraffin is drawn into the cylinder, and, as the engine cools down, this condenses and travels down past the piston, and on its way washes away the cylinder oil and on its arrival in the crank chamber it dilutes the oil there and causes the bearings to be scored. Unless provision is made to cope with this, much trouble is liable to be experienced in vertical engines. To prevent trouble from this cause I generally finish the running on gasoline, so that 3 or 4 minutes before I stop the engine I change over from paraffin to gasoline.—From *The Autocar*.

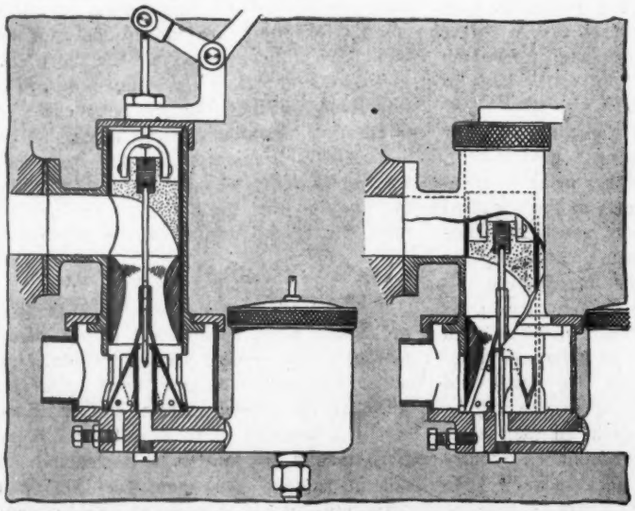


Fig. 3—Part sectional views of Cox carbureter, left with throttle open, right with throttle closed

# Cox Carbureter Out

## Has Single Jet and Positive Mixture Regulation

A SIMPLE single-jet carbureter has been brought out by Arthur Cox, of Birmingham, England, which has many novel features of construction to recommend it to the student of carbureters. It may be said to consist of an L pipe with a jet in it. The jet takes the form of a .25-inch tube with a cap having an orifice of about .125 inch. Into this orifice a taper needle is entered and withdrawn as the throttle is closed or opened. At its closed position there is still a small annular space between the needle and the side of the jet orifice and, of course, as the needle is raised the area of the orifice and, consequently, the supply of gasoline is increased, Fig. 3. Round this jet is a series of air ports having taper bottoms which are not sharp V-tapers, but slightly curved, and these ports are opened or closed as the needle is moved up and down in consonance with the opening or closing of the throttle. The throttle consists of a tube with a curved passage in it, this passage registering with the inlet pipe. The tubular throttle, further, carries the needle for the jet, and as it is raised or lowered, *i. e.*, opened or closed, it also opens or closes the air ports. When the throttle is fully open the needle is raised high in the jet and the air ports are also wide open, and it will be seen that on full throttle the carbureter is of the most open type, providing a perfectly free passage for the air, both before and after carburetion, into the engine.

### Low Speed Provided For

This kind of carbureter is well known to be satisfactory for high speeds and full power, but it is difficult to get easy starting and good slow pulling with it, and the way Mr. Cox has overcome the difficulty is as ingenious as it is simple. In the slow running and starting position the throttle is practically closed, the air ports are closed all but a fraction, only just the fine point of the V being open, and the needle is well into the jet orifice, so that the annular space between it and the jet orifice is very small indeed. It will be noticed that around the jet tube is a petticoat, or cone, in which some small holes are bored, and there are holes beneath it through which air is drawn, in addition to that passing through the tiny apertures at the bottom of the V-slots. The larger of these under holes can be adjusted by means of a bolt and nut, so that the adjustment can be set for slow running.

The throttle is formed in one piece with the choke tube, and consequently the latter moves up and down with it. In the slow-running position, therefore, the most restricted diameter of the bore of the choke is at the same level as the top of the jet, so that the negative pressure is maintained despite the throttle closing and the resultant loss in engine speed. At the other extreme, *i. e.*, full throttle, the choke is raised high and the top of the jet is in the largest diameter of the choke tube, as shown in the left-hand view.

It will be realized that at all times the gasoline issuing from the jet is of annular form—that is to say, it takes the form of a very thin-walled cylinder, or pipe, of gasoline, and, the clearance between the needle and the jet being infinitesimal in the starting or nearly closed position, the atomization is remarkably good, besides which the suction on the jet is very strong, so that plenty of gasoline is obtained for starting, slow running and acceleration.

It will be noticed on studying the drawings that the carbureter has been designed to provide the minimum of resistance to the passage of the air and carbureted air through it; indeed, all its proportions are the result of patient experiment.—From *The Autocar*.

# American Automobiles in World's Markets

## Latest Consular Report Shows Low-Priced American Car a Fast-Growing Favorite in European Countries—Best Exporting Methods for Manufacturer Outlined

A SECOND special consular report in the form of a supplement to that issued last summer under the title of Foreign Markets for Motor Vehicles has just been issued by the Department of Commerce and Labor at Washington. The first of these publications was dealt with in THE AUTOMOBILE for August 22, 1912. All the separate reports from the various countries received since that time have been incorporated in the booklet just brought out under the title of Development of Motor Trade Abroad.

The reading matter contained is of great interest and should prove of exceptional value to the American manufacturer who wishes to obtain accurate information relative to the conditions of trade and other requirements of contemplated fields for the exploitation of his product.

Figures dealing with the number and value of the imports into each country are included in the separate reports and although those for the year 1912 are not yet available except in one or two cases, the statistical information given, covering generally the last 2 or 3 years, is sufficient to furnish a useful indication of the most profitable market for exported automobiles.

### Cyclecar Possibilities

One of the chief foreign markets for low-priced American automobiles is the United Kingdom. This year a prominent feature of the British report is the amount of space devoted to the new light vehicle termed the cyclecar, the manufacture of which is already an industry of considerable importance in England and in one or two other European countries. It is suggested that it may be practical to meet the British demand for these cars by producing an American vehicle of the same type. Cyclecars are built with three or four wheels, with a track of 36 to 40 inches, and as a general rule are two-seaters, though there are a few carrying three or four passengers. The narrower gauge cars are built to carry passengers tandem, but those in which the passengers ride beside each other have been most favorably received. The fact that these vehicles can be run cheaply is a point in their favor that is having far-reaching results, and the indications are that the demand is growing at a faster pace than the production. The average price is around the $500 mark or slightly above.

The motorcycle, too, is a thriving industry in Great Britain and there seems to be no reason why an increased market should not be created for high-grade American motorcycles provided they meet the English demand as to type, construction and price.

### Requirements

But while the use of these smaller vehicles may be worthy of some consideration by the American manufacturer, naturally the chief interest of the booklet centers on the progress and prospects of exported passenger cars. American exporters of automobiles have established firm trade connections with several foreign markets, and have overcome, by the excellence of their product, the conservatism which was a feature of the European attitude a few years ago. But if these excellent beginnings are to be maintained, a close study of the special requirements of the foreign markets must form part of the exporter's policy. Some valuable suggestions, gathered from the several consular reports as well as from his own individual observation, are given by the consul-general. These include the following:

The personal visit of some responsible member of the exporting firm is necessary to the establishment of a successful agency in Europe. It is not sufficient to send a subordinate except to collect preliminary information.

2. There must be a complete stock of parts available and facility for quick supply and repair, as our cars are in direct competition with foreign cars, for which spare parts can be had in a few days in any part of the continent.

3. It is essential that the exporter show a real economy in the operation of his car, because of the vastly higher price of gasoline in Europe. It appeals to the thrift of the average foreign buyer, and is the foremost claim that can be made for any car in the first stages of its introduction.

4. It seems desirable to concentrate efforts on a smaller number of cities than is becoming the custom of some manufacturers. Where countries are small and populations compact, better results will be attained by a general agent in each commercial capital. Some countries require more than one agent because they have more than one capital. This is true of Italy and Germany but not of France, where Paris is the natural center from which the entire country may be covered.

5. Exported cars must have a high degree of durability. It is not the habit of the Continental buyer to get a new car every season. In time some arrangement could be made for the exchange of old cars for new, as is done by European makes. But in general the European buyer runs his automobile much longer than is the rule in America.

Following are brief digests of the reports from each of the countries which are considered in this comprehensive booklet.

### United Kingdom

The extensive sale of American cars is still a much-talked-of subject in English automobilism, but several British experts now acknowledge that the introduction of the American product has not only stimulated the home manufacture, but has also extended the entire market considerably. The manufacture of low-priced cars here is undoubtedly due in a large measure to the American initiative. Durability is to be insisted on. The slightest deterioration in the quality of a single American make which is sold to any extent abroad will not only affect the particular manufacturer disastrously, but will cause definite injury to the prestige of all American manufacturers selling automobiles in foreign countries.

An important point in connection with the wants of the British buyer is that while the excellent running powers of the engine and operating parts are giving complete satisfaction there are indications that he would be willing to pay a little more for increased comfort in the upholstery and a finer body finish to the car in general. It is for this reason that there appears to be a considerable market for the manufacturer who cares to supply a chassis without body so that the body can be fitted to meet the special wishes of the purchaser.

### Chassis Wanted

It is claimed that a good chassis at $500 or slightly more would meet with a ready market. The chassis should include a 15 to 20 horsepower engine, four cylinders, three or four-speed gearset, and be capable of a speed of 25 to 35 miles per hour. Self-starters are said to be in demand but not in supply. An agent for American cars said that if Americans are to command the field in this line they must come

quick or lose the market, as many experiments are being tried there and a perfect appliance is looked for at any time.

It is estimated that British manufacturers are supplying two-thirds of the home demand, about sixty firms offering nearly two hundred types of machines, supplying an annual output well over 20,000.

### France

According to official statistics, the value of the automobiles imported into France from the rest of the world in the 3 years 1909, 1910 and 1911 was, respectively, $1,453,483, $1,677,556 and $2,223,746. The noteworthy increase in 1911 was due almost wholly to the increased popularity of the moderate-priced American car. This increase was maintained in 1912, the imports of American automobiles in the first 10 months of 1912 being $328,000 greater than in the same period of 1911.

The Paris salon of 1912 will be memorable as the first automobile exposition held there in which American cars and accessories were displayed on a scale which adequately represented the American automobile industry. Formerly, American makers were for the most part absorbed in their home trade. This state of affairs is now changed and there can be little doubt that the popularity of the American vehicle in France will continue to grow.

### Belgium

The Belgian automobile industry is enjoying a boom due to an enormous increase in its sales abroad. The import figures for 1910 and 1911 show a decrease while the export trade for the same year shows the enormous increase of 75 per cent. This country therefore does not seem to offer a very profitable field for the American manufacturer. In 1911 only thirty-two automobiles were imported from the United States, while the imports from France, the adjacent country supplying the bulk of the machines imported into Belgium, are declining. The manufacture of automobile bodywork is an important industry in Belgium, many accepted features of present day body design having originated in that country. In 1911 the value of exported Belgian automobile bodies amounted to $1,158,000.

### Spain

Although France dominates the Spanish market the United States is becoming a keen competitor and, according to information received from local agents, the American automobile has now gained a strong foothold in Spain in spite of the fact that its introduction was exceedingly difficult. The sale of low-priced American machines in Spain is not, however, as extensive as it might be and one of the reasons given for this restriction of trade is the big profit exacted by the local agent from purchasers, which brings the selling price to almost double that asked by the agent in the United States. As showing that there is a better market in Spain for the lower priced automobile the import figures for the years 1910 and 1911 provide an interesting contrast. In the first of these years the total number of cars exported was 393 at a value of $739,230. For the following year the number of cars reached 612 but the actual value represented a decrease, the figure being $565,422. This latter amount is roughly one-quarter of the total value of automobiles imported into France for the same year. Imports from France into Spain during 1911 totalled $392,973, while those from the United States represented $68,723. The figures for 1912 are not yet available, but the ratio between French and American imports will in all probability show a decided decrease. Machines of high power are not desired by the Spanish people, the average car running from 12 to 20 horsepower.

### Russia

Russian roads are unsuitable for automobiles and the streets of all cities, except a few in the capital and Moscow, are even worse, as they are paved with cobblestones. In spite of these conditions, however, the sale of automobiles is increasing rapidly and as the home manufacture so far is only slight the market for the outsider is profitable. There is a real demand for cars of all classes, particularly of the cheap but strong kind, in both the larger cities and the provinces, and few cities in Europe afford better opportunities for the extension of American trade, though there is a certain prejudice to live down due to the introduction a few years ago of some American cars that did not show any conspicuous merits.

### Italy

The serviceable low-priced American automobile is also making its mark in Italy. For the 11 months ending November 30, 1912, there were imported into this country 227 cars of American manufacture, as against 145 for the calendar year 1911, only 25 in 1910 and 7 in 1909. While Italian agents are at present manifesting special interest in American machines, complaints have been made that although the American car is an excellent one for the money, the deliveries have been slow. The manufacturing output of Italy is also increasing rapidly. In 1911 the number of machines turned out amounted to nearly 5,000, this figure including trucks. This output is likely to be raised to 8,000 for the year 1912. The actual figures are not yet available.

### Argentina

Although France supplies the largest number of automobiles, the sale of American cars in Argentina is increasing satisfactorily. In 1911, automobiles to the value of $330,126 were imported from the United States, a figure which has been exceeded by the imports registered during the first 9 months of 1912, the total value for that period being $392,197. It is estimated that almost half the cars in this country are used in Buenos Aires.

### India

The latest figures from India show a remarkable increase in the imports from the United States. For the past official year ending March, 1912, the value of American cars reached $195,925, four times the amount of 1910-11. This puts the United States into second place, the United Kingdom still retaining the bulk of the trade, and shows that our manufacturers are taking a serious interest in the Indian market. The sales from Belgium, France and Italy are falling off, while those of Germany indicate a slow progress.

### Japan

In 1912 the automobile business made rapid progress in Japan. This year in Tokio licenses have been issued to 305 machines and in Yokohama 108 licenses have been granted. The combined figure for both cities last year was only 194, so it will be seen that the increase registered is well over 100 per cent. In Tokio a taxicab company has been formed and has in regular service fifty-six cars of American manufacture.

### Australia

The latest figures available in regard to the importations of automobiles into the Commonwealth of Australia show the trade to be thriving in every state. During 1911, chassis, bodies and complete vehicles, including motorcycles, to the value of $6,019,947 were imported. The United Kingdom led in countries of origin with shipments valued at $2,265,801, and the United States was next with $1,268,096. The American has obtained a strong hold on this market.

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## Trade Opportunities

**Automobile Agencies**—An American consul in the United Kingdom, in a report on the sale of automobiles in his district, writes that the cars most in demand at present are from 15 to 20 horsepower. Three firms have expressed a desire to enter into correspondence with American manufacturers with the view of acquiring agencies. Correspondence in English. Inquire at the Bureau of Foreign and Domestic Commerce, Washington, D. C. File No. 10,713.

**Electric Automobiles**—An American consul in a European country reporting on the market for electric automobiles in his district states that two local business men are interested in receiving offers and catalogues from American manufacturers of very cheap and light American electric cars which could be sold to the public at about $1,500. File No. 10,762.

# Factory Miscellany

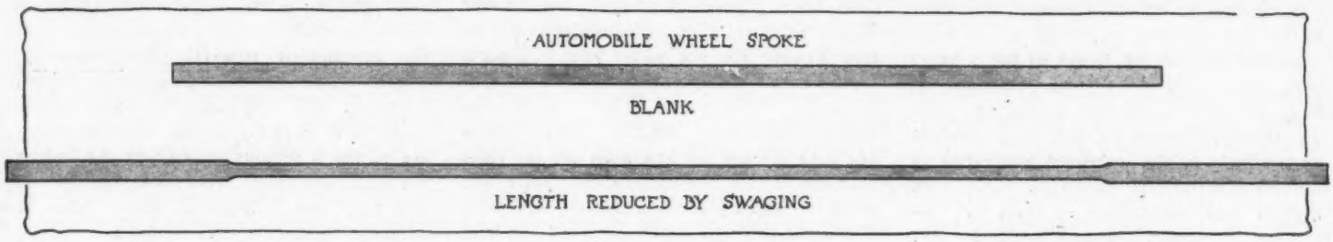
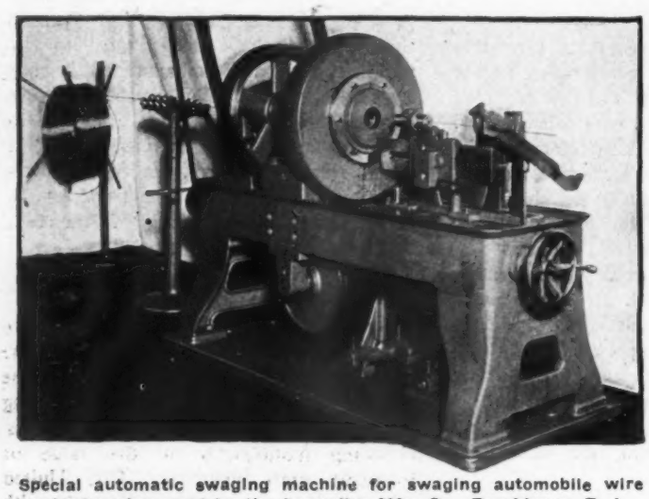



**Diagram showing wire spoke for an automobile wheel in two stages of construction. A blank spoke is shown above, while below it is illustrated the effect produced by the swaging machine**



**Special automatic swaging machine for swaging automobile wire wheel spokes used by the Langelier Mfg. Co., Providence, R. I.**

THE accompanying illustration shows an improved type of automatic swaging machine designed and built by the Langelier Mfg. Co., Providence, R. I., for swaging automobile wire wheel spokes such as shown in the above diagram. It takes the wire from the coils, straightens it before entering the machine, swages the spokes between butts and mechanically cuts them off to length after swaging, all operations being entirely automatic and absolutely without waste or manual handling.

This machine has a very high output, on ordinary automobile wire wheel spokes this output reaching as high as three spokes a minute, all straightened, swaged and cut off. This efficiency is obtained by eliminating all time losses between operations. While one spoke is being swaged, a finished spoke is being cut off.

The coil of wire is supported on a wire reel resting on the floor at the extreme left, from which it unwinds as it is drawn through the straightener on its way to the swaging machine. This straightener is of the rotary type. It has offset steel eyelets mounted with ball bearings in suitable holders, so designed that the offset eyelets do not bear in an unyielding manner against the passing wire, but revolves so that no marring of the finish of the wire occurs, as in ordinary wire straighteners.

The wire enters the swaging machine through the rear end of the hollow spindle carrying the dies, and as it is drawn through these swaging dies, these close automatically over the wire, after allowing the portion forming the butt to pass out of them, and impart a high number of sharp, clean blows simultaneously in couples from diametrically opposite directions on the stock, reducing it rapidly and giving it a sort of hammer temper, for the distance between the butts, when the dies again open mechanically, allowing the portion of wire forming the opposite butt to pass out of the machine unswaged.

The outward travel of a saddle with chuck mounted on a horizontal slide, in front of the machine head draws the wire through. This saddle is provided on its rear with a rack seen projecting at end of slide in photograph, in which meshes oscillating segment gear, already set in motion by a face cam and roller underneath the bed of the machine.

The connection between the segment and the cam roll lever is obtained by means of a special form of link having a right and left hand nut, readily reached and locked from the rear, which, upon being adjusted vertically, varies the centers of the link pins, increasing or decreasing the arc of travel of the segment gear, correspondingly varying the travel of the saddle on the horizontal slide above the bed, producing spokes of different overall lengths and with different swaged portions between the butts.

Forced oil lubrication to all running parts and on the dies is maintained by an automatic oil feed pump. Other types of wire feeds besides that described are also put on to suit different makers' spokes and the machine is built for either belt or motor drive. The machine weighs 5,550 pounds and takes up a floorspace about 3 by 6 feet.

**REMY Negotiating for Factory**—Frank and Perry Remy, of Anderson, Ind., are negotiating for a factory building in that city and expect to re-enter the manufacturing business in a short time. Since their return from Europe some time ago they have maintained a laboratory and have perfected a number of electrical devices. They formerly owned the Remy Electric Co., which they sold 2 years ago.

**Installing Steel-Tempering Furnace**—The Spokane Auto Parts Co., Spokane, Wash., is preparing to install a large gas steel-tempering furnace.

**Dyneto Plant Moved**—The Dyneto Electric Co., Syracuse, N. Y., has removed its plant from Elbridge, N. Y., to Syracuse, occupying the plant of the Crouse-Hinds Co.

**Buckeye Awards Contract**—The Buckeye Rubber Co., Akron, O., has awarded a contract for the construction of a brick, steel and concrete factory addition, to cost $25,000.

**Lenox Buys Property**—The Lenox Motor Car Co., Boston, Mass., has secured the property owned by Norman Marshall on Factory street, in the Hyde Park section, and will convert it into an automobile plant.

**Timken Employs 1,500**—In the April 10 issue of THE AUTOMOBILE it was stated that the Timken Detroit Axle Co. employs 150 men. This was a typographical error, as this company has 1,500 men on its payroll.

**Want Chandler Building Bids**—The W. S. Ferguson Co., engineers, announces that it will be ready for bids in the near future for the general contract of building the new Chandler automobile plant at St. Clair avenue, Cleveland, O.

**Velie Increases Capacity**—The Velie Motor Vehicle Co., Moline, Ill., has increased its capacity by the construction of a new plant operating under the name of the Velie Engineering Co., which is devoted exclusively to the manufacture of trucks.

**Chase Contemplating Additions**—The Chase Motor Truck Co., Syracuse, N. Y., is contemplating extensive building improvements. Plans are being contemplated for doubling the capacity of the general offices and greatly extending the manufacturing facilities of the plant.

**Hawthorne Planning to Build**—The Hawthorne Mfg. Co., manufacturer of automobile horns and metal stampings, is having plans prepared for a new five-story building in which it is proposed to begin construction sometime this spring. This company recently installed some additional drop presses.

**Cole's $150,000 Addition**—The future production figures for the Cole Motor Car Co., Indianapolis, Ind., will double, a $150,000 addition to the present plant on East Washington street will be built, and the organization generally enlarged. A four-story building has been started and is expected to be completed by October 1.

**Weller-Thomas Plans Plant**—The Weller-Thomas Co., recently incorporated by Zanesville, O., capitalists, is planning to erect a plant for manufacture of motor-driven fire apparatus. The high waters of the latter part of March may make it necessary to postpone the arrangements. The concern was incorporated at $1,000,000.

**Students Inspect Milwaukee Plants**—A party of 150 engineering students of the Ohio State University at Columbus, O., spent 2 days inspecting Milwaukee, Wis., industries recently, visiting many of the automobile plants.

**Aluminum Goods Awards Contracts**—The Aluminum Goods Mfg. Co., Manitowoc, Wis., has awarded contracts for the construction of additions costing $45,000 and which will be completed by September 1. This will increase its output by 35 to 50 per cent.

**Klumb to Erect**—Paul Klumb, of Sheboygan, Wis., has organized a new company with his two sons, Ewald and Oscar, to engage in the manufacture of gasoline motors. A plant will be erected in the near future. The main building will be 150 by 80 feet.

**Establishes Welding Plant**—The American Gas Engineering Co., recently organized at Sheboygan, Wis., by E. M. Parmelee, B. Lucas and L. L. Rowlands, has established a welding and general machinery plant as the nucleus of the gas engine business which its founders intend to ultimately establish.

**Chase to Increase Facilities**—The Chase Motor Truck Co., Syracuse, N. Y., is contemplating extensive building improvements. Plans are now being completed for doubling the capacity of the general offices and greatly extending the manufacturing facilities of the plant. The company increased its working forces two months ago and also started running night as well as day shifts.

**To Make Tires**—As the result of a strike of thirty employees of the strapping and cementing department of the Chicago Rubber Clothing Co., at Racine, Wis., it is probable that the concern will discontinue the manufacture of rubber clothing and turn the big plant into a motor car tire manufactory. The plant is well equipped and it would require only a small outlay to equip for the production of tires.

**New Clintonville Plant**—The Four Wheel Drive Automobile Co., Clintonville, Wis., has awarded all contracts for factory No. 3, the newest and largest addition to its plant at that city, which is to be ready for operations July 1. Upon its completion work will be started on factory No. 4, which is to be 100 by 120 feet, similar to the No. 3 building now under way. A power house 40 by 40 feet in size will also be erected without delay. The improvements will cost in excess of $75,000.

**Morgan & Marshall's Plant**—The Morgan & Marshall Rubber Co., East Liverpool, O., announces new plans and specifications for a new plant. The company will expend about $1,200,000 for the construction and expects to turn out 500 tires a day at its completion. Ground will be broken in May for three buildings, 60 by 120 feet and 50 by 120 feet. They will be two stories high. There will also be a boiler house, 30 by 100 feet in size. Steel truss construction will be used throughout.

**Canadian Goodrich Plant Activities**—The B. F. Goodrich Co., Toronto, Ont., is definitely committed to a new Canadian factory, which will be commenced just as soon as the weather permits the builders to get busy. Thirty-two acres of land have been secured at St. Catherines, Ont., conveniently located for the handling of traffic by railroad and the new factory will be modeled on the lines of the parent Akron, O., plant. When fully developed it is planned to employ 1,000 hands, with ample provision for future extensions.

**New Wisconsin Aluminum Group**—The Wisconsin Foundry Co., Manitowoc, Wis., which recently increased its capital to $110,000 to provide for the construction of an entirely new plant, has received plans for a new group from its architect. The plans call for a large casting shop, 50 by 100 feet in size and 40 feet high; an assembling and finishing room, 50 by 105 feet, and an administration building, 40 by 60 feet in size and two stories high. It will be ready about September 1. The company agreed to expend $360,000 in wages in 6 years' time in order to secure the donation of the new site from the Citizens' Assn. of Manitowoc.

**Ambridge Has Automobile Plant**—Ambridge, Pa., has joined the ranks of the automobile manufacturing cities. Recently several Ambridge men got together and purchased the parts for twenty automobiles from the Pitt Motor Co., of Pittsburgh, Pa., when that concern went out of business. These parts have been shipped to Ambridge and are now being shipped assembled in an old planing mill building. D. C. Anderson, manager of the Economy Electric Co., has charge of the work, and several men are being employed at the present time. Six more expert mechanics are wanted, as it is a desire of the projectors to have the machines ready for market within the next few weeks. The persons interested in the project are Mr. Anderson, C. G. Carr, Dr. P. J. Sohn, F. C. Schroeder and David Challis.

**Shows, Conventions, Etc.**

May 20-21.....Boston, Mass., Convention of Electric Vehicle Makers.
June 2-7.....Racine, Wis., "Made in Racine Exposition," J. I. Case Co.'s foundry.
June 5, 6, 7.....Detroit, Mich., Midsummer Meeting of Society of Automobile Engineers.
October .....Paris, France, Automobile Show, Grand Palais; 10 days.
November .....London, Eng., Annual Automobile Exhibition, Olympia.

**Race Meets, Runs, Hill Climbs, Etc.**

May 2.....New York City, Secret Time Run to New Rochelle, Motor Dealers' Contest Association.
May 5-8.....Washington, D. C., Motor Truck Reliability, *Washington Post*.
May 14.....New York City, Start of 2-Day Hudson and Catskill Scenic Tour.
May 17.....Atlanta, Ga., Automobile and Accessory Association Annual Hill Climb.
May 30.....Indianapolis, Ind., 500-Mile Race, Speedway.
June 7.....Philadelphia, Pa., Inter-Club Reliability, Quaker City Motor Club, Autombile Clubs of Delaware County, Philadelphia and Germantown.
June 16, 17, 18.....Columbus, O., Reliability Contest, *Ohio State Journal*.
June 25-28.....Chicago, Ill., Non-Motor-Stop Reliability, Chicago to Boston, Chicago Automobile Club.
July 1.....Indianapolis, Ind., Tour of Indiana Automobile Manufacturers' Association to the Pacific Coast.
July 1-16.....Winnipeg, Man., Motor Plow Competition, Dr. A. W. Bell, Manager.
July 4-5.....Sioux City, S. Dak., Track Meetings, Sioux City Automobile Club and Speedway Association.
July 5-6.....Tacoma, Wash., Road Race, Montemara Festa Automobile Committee.
July 8-16.....Winnipeg, Man., Midsummer Exhibition, A. C. Emmett, Manager.
July 27-28.....Tacoma, Wash., Tacoma Road Races.
Nov. 24.....Savannah, Ga., Vanderbilt Cup Race, Motor Cups Holding Company.
Nov. 27.....Savannah, Ga., Grand Prize Race, Automobile Club of America.

**Foreign.**

May .....St. Petersburg, Russia, International Automobile Exposition, Building of Michael Maneze, Imperial Automobile Club of Russia.
May 7-10-11.....Paris, France, Sarthe Automobile Meeting and Speed Hill Climbing.
May 11-12.....Palermo, Sicily, Targo-Floria Race.
June 3-7.....London, Eng., Third International Road Congress, Rees Jeffreys, General Honorary Secretary.
June 23-28.....London, England, International Road Congress.
July 12.....Amiens, France, Grand Prix Race.
July 13.....Paris, France, French Grand Prix Cyclecar Race.
July 18-26.....London. Eng., Imperial Motor Transport Conference.
Sept. 21.....Boulogne, France, 3-Litre Race.
Sept. 25.....Isle of Man, International Stock Car Race.
October .....Paris, France, Paris Automobile Show.

**Plant of the Rochester Electric Motor Co., Rochester, N. Y., occupying 35,000 square feet. The machinery is driven by individual motors and group drive**

# The Week in the Industry

## Engineer — Dealer — Repairman — Garage

This illustration shows how the State of Connecticut got rid of a dangerous turn in the highway by changing the course so that the road is straight. The old iron bridge at the left of the white fence was formerly used

Crossing at Berlin, Conn., where a number of serious and fatal accidents have occurred. Note the absence of gates

The death trap, one which the motorist should eliminate. This has been the cause of many fatalities in the state of Connecticut

LOCOMOBILE BUILDING NEW HOME—The breaking of the ground for the new salesroom and service station on West 61st street, just off Broadway, marks the most important steps taken by the Locomobile Co. of America, in New York City since their start back in the earliest days of the automobile industry. The new building, which will be eleven stories high, will be completed in October, and will have a frontage of 100 feet on 61st street. The front of the building will be devoted to show rooms with offices on the mezzanine and second floor, while the upper floors will be devoted to storage, repair shop, paint shop and room for rebuilt cars.

FIRE TRUCK FOR SELMA—Delivery has been made in Selma, Ala., of a new automobile fire truck.

GRIBBEN WITH CENTRAL MOTOR—W. C. Gribben has been appointed manager of the Central Motor Car Co., Lexington, Ky.

PULLAR COMPANY FIRESTONE AGENT—James Pullar & Co. have been appointed Hartford, Conn., agents for Firestone tires and rims.

KING FERDINAND BUYS MERCEDES—The Bulgarian ruler, King Ferdinand, has bought a Mercedes car equipped with a Knight engine.

NEW FIRESTONE ADVERTISING MANAGER—E. S. Babcox is now advertising manager of the Firestone Tire & Rubber Co., Akron, O.

LAWTON BI-MOTOR SALES MANAGER—C. T. Lawton has been appointed sales manager of the Bi-Motor Equipment Co., Boston, Mass.

OPEN TIRE REPAIR SHOP—The Hartford Steam Vulcanizing Wks., Hartford, Conn., have opened a tire repair shop on Mulberry street.

TIRE AGENCY BUILDS ADDITION—The Automobile Tire Co., 129 Allyn street, Hartford, Conn., has acquired double floor space by building an addition.

MANHATTAN CLUBROOMS OPENED—The new clubrooms of the Manhattan Automobile Club, 222 West 59th street, New York City, recently opened to members.

BUMP RETIRES—F. R. Bump recently retired from the R-C-H Corp., Detroit, Mich. He was the sales manager of the company, with headquarters at Detroit.

NOW HANDLES SHAWMUT TIRES—The Imperial Motor Tire Co., Washington, D. C., has succeeded the Imperial Motor Co., and will handle Shawmut tires.

SMITH SALES MANAGER—R. Scott Smith has been appointed sales manager of the E. C. Johnson Co., Philadelphia, Pa., distributor of the Reo and Premier cars.

QUIMBY WITH PACKARD—J. C. Quimby has joined the sales force of the Packard Motor Car Co., of Boston, Mass., as assistant manager of the used car department.

WILCOX RESIGNS AS REGAL MANAGER—George Wilcox has resigned from the staff of the Regal Motor Car Co., Detroit, Mich. He was the company's sales manager.

NEW UNIONTOWN GARAGE—The Craig Motor Car Co., Uniontown, Pa., is completing a garage on East Main street and will embark in the automobile business there.

ROWLAND ADVERTISING AGENCY MOVES—The Rowland Advertising Agency, Inc., has moved to the United States Rubber Bldg., Broadway, at 58th street, New York City.

SIBBALD RESIGNS FROM SALESMANAGERSHIP—F. C. Sibbald has resigned as sales manager of the Probey Co., Washington, D. C., and has been succeeded by W. D. Arrison.

KUHNS RESIGNS FROM STUDEBAKER—E. L. Kuhns has resigned from the Studebaker Corp., Detroit, Mich., where he served in the capacity of sales and branch manager.

BOOGHER RESIGNS FROM APPERSON—H. H. Boogher, of Seattle, Wash., recently resigned his position as secretary and manager of the Apperson Motor Car Co., of that city.

QUAKER TIRES IN BINGHAMTON—H. H. Young, Binghamton, N. Y., has secured an agency there for Quaker automobile tires, made by the Quaker City Rubber Co., Philadelphia, Pa.

TEN FORDS FOR URUGUAY—Ten Ford cars were exported through New Orleans, La., for Uruguay recently. The cars were assembled and put in extra heavy crates at New Orleans.

NEW BOSCH APPOINTMENT—The Bosch Magneto Co., New York City, has appointed the Motor Parts Co., 185-187 Columbus avenue, Boston, Mass., as distributor of its products.

AKRON WANTS FIRE TRUCK—Bids will be received by D. P. Stein, director of public safety of Akron, O., until May 20 for an automobile fire engine for use of the fire department.

ROSE PACIFIC LOZIER MANAGER—L. H. Rose has been appointed Pacific Coast manager for the Lozier Motor Co., Detroit, Mich. He will make his headquarters in San Francisco, Cal.

ATKIN WITH SHEFFIELD SIMPLEX—Captain J. E. Atkin recently arrived from England to take charge of the sales department of the Canadian Sheffield Simplex Auto Co., Toronto, Ont.

DAVIS IN DETROIT—D. D. Davis, recently chief engineer of the Hayes Wheel Co., Jackson, Mich., has been placed in charge of the Detroit, Mich., office of that company at 617 Ford building.

SLEEPER WITH NEW CONCERN—I. S. Sleeper, former advertising manager of the Firestone Tire & Rubber Co., Akron, O., is now general sales manager of the Colonial Printing Co., Cleveland, O.

HOFFMAN FIRESTONE SYRACUSE MANAGER—E. A. Hoffman has been appointed manager of the Firestone Tire & Rubber Co., at Syracuse, N. Y. The branch is located at 504 East Genessee street.

WAHPETON GARAGE ORGANIZED—The Wahpeton Garage Co., Wahpeton, N. D., has been organized and will construct a two-story brick building, 50 by 130 feet. Mayor Frank Eberley is president.

BUSES REPLACE STREET CARS—The city of Huntington, Ind., has declined to grant a franchise for a street car line and has substituted in its place a motor omnibus service under a 20-year franchise.

JACKSON COLE TERRITORY MANAGER—The Henderson Motor Car Co., Indianapolis, Ind., has appointed W. E. Jackson as territory manager for Southern Illinois with headquarters in Indianapolis.

APGAR RESIGNS FORD MANAGERSHIP—H. C. Apgar, formerly manager of the Ford Co., in Dallas, Tex., has resigned as manager of the company and will enter the automobile business for himself.

GOES TO FACTORY—Warren Atkinson has just been transferred to the factory of the Lenox car in Boston, Mass., from the Bassett Garage, Bridgewater, and he is to have charge of the stock room.

WOMAN GARAGE MANAGER—J. C. Redmond is claimed to be the only woman garage manager in California. She took over the business from her son, C. A. Redmond, 4317 Central avenue, Los Angeles.

NOW WITH MICHIGAN—John Fischer has become manager of the retail sales department of the New England branch of the Michigan Motor Car Co. of Boston, Mass. He was formerly with the Hupmobile.

APLCO LIGHTING IN COLUMBUS—The Rogers Supply & Tire Co., Columbus, O., has taken the central Ohio agency for the Aplco lighting and self-starting systems, manufactured by the Apple Mfg. Co., Dayton, O.

INDIANAPOLIS TO BUY AUTOMOBILE—On the recommendation of fire chief Coots, the board of safety of Indianapolis, Ind., will purchase an automobile for the use of the superintendent of the fire alarm telegraph system.

VESTA SERVICE STATION OPENED—A branch office and service station has been opened in Providence, R. I., for the installation and care of Vesta electric lighting systems for automobiles, by the Vesta Providence Co.

CUTTING ENTERS RICHMOND—The Cutting Motor Car Co., Jackson, Mich., is preparing to enter the Richmond, Va., field and has rented a salesroom next to the Chamber of Commerce building on Main street, near Fifth.

SMITHSON IN CHARGE—B. M. Lindsley, Southwestern manager for the Kissel Kar Co., Dallas, Tex., announced recently that G. W. Smithson would have charge of the commercial vehicle department of that company.

BOLTON CHANGES DETROIT ADDRESS—L. D. Bolton, representative of the Brown-Lipe products, Spicer universal joints and Kinsey radiators and gaskets in Detroit, Mich., has moved to larger offices at 2215 Dime Savings Bank Bldg.

DYE RESIGNS—J. E. Dye, manager of the Begg Motor Car Co., Vancouver, B. C., has severed his connections with that firm. He will become managing director of a new company being incorporated and in the same line of business.

THREE YEARS CONTRACT—W. D. Myers, sales manager of the Stutz, has been in Boston, Mass., a few days, where he signed a contract with M. H. Chase, who handles the Stutz in that territory, to take these cars for the next three years.

WARREN RESIGNS FROM HAYNES—C. B. Warren, general manager of the Haynes Automobile Co., Kokomo, Ind., has resigned. His resignation will take effect on the first of June. He was formerly manager of the New York City branch.

FLYNN EASTERN SALES MANAGER—J. J. Flynn, formerly manager of the Locomobile branch in Washington, D. C., has been appointed eastern sales manager of the Standard Electric Car Co., that city, and will have headquarters also there.

BACK ON THE OLD JOB—E. H. Broadwell has gone back to his old position as vice-president of the Fisk Rubber Co., which he resigned to go with the Hudson Company at Detroit, Mich. He will make his headquarters at Chicopee Falls, Mass.

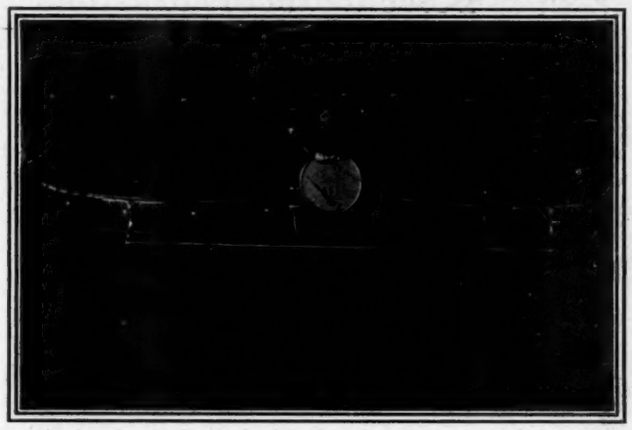
TAXICAB SERVICE IN ST. PAUL—The Cook Carriage & Omnibus Co., St. Paul, Minn., will establish a taxicab service with rates based on the zone system. Taxicabs of 1913 model will be installed and the speed restriction will be 15 miles an hour.

NADDY COLUMBUS VISCO REPRESENTATIVE—The Visco Motor Oil Co., Cleveland, O., has appointed Charles Naddy, of Columbus, O., to act as representative for its products in Columbus, and all counties in the central and southern parts of Ohio.

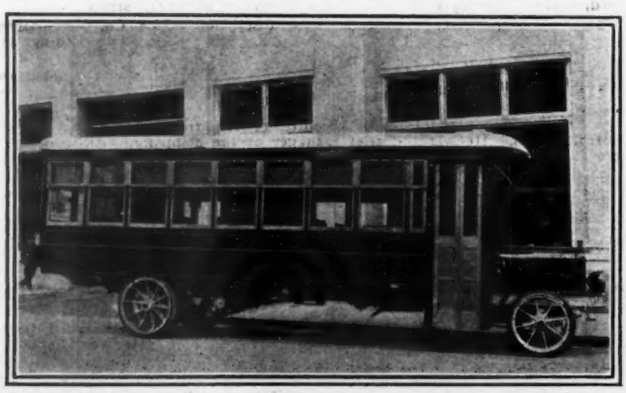
NEW VANCOUVER GARAGE—The Archibald Garage, on 1230 Georgia street, Vancouver, B. C., was recently completed. It was built at a cost of $30,000. It is built of reinforced concrete, has an entrance on two sides and a total floor space of 18,000 square feet.

CARBURETOR COMPANY'S NEW DEPARTMENT—The Wheeler-Schebler Carburetor Co., Indianapolis, Ind., maker of the Schebler carburetor, has established a publicity department in connection with its advertising department. Joseph Kelly has been placed in charge.

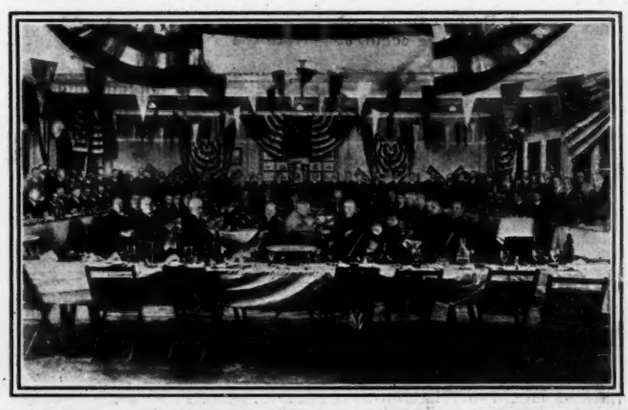
MUNGER COMPANY ENLARGING—The Munger Automobile Co., Dallas, Tex., is adding a two-story building to the big automobile district of that city. It is to cost upwards of $12,000 and will be located at Main and Preston streets. This company handles the Cadillac cars.



**A new idea in automobile equipment was evolved by a recent purchaser of a Lozier six, who ordered the speedometer placed on the rear of the front seat, facing the occupants of the tonneau. In placing the speedometer in the tonneau a special tube over 6 feet in length was used, owing to the distance of the dial from the front wheel. Among other novel ideas on the car is the placing of the electric horn midway between the two headlights in front of the radiator. Two push-buttons near the tonneau door are connected with the electric horn and the speedometer light, so that the owner is able to apprise pedestrians of the car's approach in case the driver fails to give warning in time.**



**One of the pay-as-you-enter white buses used by the Pittsburgh Auto Transit Co., Pittsburgh, Pa. It will seat thirty-four passengers. The wheelbase measures 229 inches**



**Banquet tendered to President J. J. Cole and Cole owners in southern California by the southern California Cole distributors, at which possible improvements were discussed**

ELECTRIC CHARGING IN GARAGE—A. J. Klein & Sons, Lomira, Wis., operating the Lomira garage, are making improvements costing $2,500. The company is equipping for tire repairs, electric vehicle charging and accessory selling.

REPLACES EIGHTY-TWO HORSES—A giant 60-horsepower farm tractor, capable of work which it is estimated would require the labor of eighty-two horses, was recently delivered at Rhinebeck, N. Y., for use on the farm of Vincent Astor.

FITZSIMMONS WITH BUFFALO ELECTRIC—George Fitzsimmons, formerly assistant sales manager of the Velie Motor Vehicle Co., Moline, Ill., has joined the Buffalo Electric Vehicle Co., Buffalo, N. Y. His work will be in connection with the sales and advertising management.

STURDY PLUGS IN CANADA—The International Accessories Co., 117 Belmont Ave., Detroit, Mich., and Windsor, Ont., has taken over the Canadian sales agency for the Sturdy Mfg. Co., Chicago, Ill., manufacturer of the Sturdy and Starite brands of ignition plugs for automobiles.

GRAHAM SANFORD DISTRICT MANAGER—J. A. Graham, formerly sales manager of the Westfield Motor Truck Co., has been appointed district manager for the New England district of the Sanford Motor Truck Co., Syracuse, N. Y. He will make his headquarters in Boston, Mass.

HARDING TAKES LEITCH BUSINESS—The business of the M. Leitch Co., Toronto, Ont., has been taken over by Frederick Harding and is being managed by him. In addition to the F. & S. annular and thrust ball bearings they have taken on a complete line of tires and accessories.

WILMINGTON NEEDS EMERGENCY CAR—It was demonstrated recently that the Wilmington, Del., police department needs an emergency car of some kind, and as soon as the city council can see its way clear to increase the department's appropriation it is likely that one will be purchased.

TAKE PUNCTUREFIX AGENCY—Ireland and Allison, Columbus, O., have taken the central Ohio agency for the Original Puncturefix Co., of Marion, O. The Puncturefix Co. manufactures a fluid which is placed inside the inner tubes for the purpose of closing all punctures automatically.

MONTREAL TO PURCHASE AUTOMOBILES—The corporation of Montreal, Que., will shortly own between twenty or thirty automobiles as the result of the decision of the Board of Control recently to recommend the purchase of five additional machines for greater efficiency in civic administration.

CHANCE FOR AGENCIES—Joseph B. Crandon, A. H. Fuller, C. W. Butterfield and Edwin A. Rowe have formed a company at Bellows Falls, Vt., and they have leased a building on Canal street where a general garage and repair business will be carried on and the territory taken for two or three cars looking for agents.

LOOKING FOR CARS—Chester P. Rowell and Carson P. Bennett have formed a company to handle taxicabs and do a general renting and garage business both at Lawrence, Mass., and Salem, N. H., just over the state line, and they have rented a building at both places. They will also take on some agencies for cars.

CONNELLY WITH DETROIT FIRM—J. F. Connelly, who has had charge of the advertising and publicity department of the Abbott Motor Co., Detroit, Mich., for the past 2 years, has resigned his position to become advertising manager of the W. H. Van Deusen Sales Co., with headquarters in the Ford Bldg., Detroit, Mich.

TWO CHANGES IN PORTLAND—Two changes were made in Portland, Ore., recently. E. A. McCarthy, of the firm of Neate & McCarthy, has withdrawn from the firm, while C. G. Arnold gave up the management of the Pacific Motors Co. Mr. McCarthy has secured the latter company, and for the present will handle the Paige and Oakland cars.

SHANAHAN NORWALK CANADIAN MANAGER—J. M. Shanahan has been appointed sales manager of the Norwalk Motor Car Co. branch in Toronto, Ont., with headquarters at 3-5 Roncesvalles avenue. The former Canadian branch was recently taken over by the parent company at Martinsburg, W. Va., and is now handled exclusively by that company through a selling branch.

HERNANDES KNIGHT TIRE MANAGER—R. M. Hernandes, who has been connected with the United States Tire Co., New York City, since its organization as special representative in the Chicago, Ill., territory, has resigned to become Eastern district manager for the Knight Tire & Rubber Co., Canton, O. Mr. Hernandes will make his headquarters at 1671 Broadway.

# Recent Incorporations in the Automobile Field

## AUTOMOBILES AND PARTS

ASHEVILLE, N. C.—Dixie Motor Co.; capital, $50,000; to deal in automobiles. Incorporators: J. C. Arbogast, R. C. Arbogast, J. E. Craddock.

BELLAIRE, O.—Bellaire Automobile Co.; capital, $6,500; to manufacture and deal in automobiles, trucks and gas engines of all kinds. Incorporators: G. D. Spragg, J. F. Johnson, George Heil, J. R. Greenlee, W. H. Morris.

BUFFALO, N. Y.—Selleck Co.; capital, $40,000; to deal in automobiles. Incorporators: W. V. Selleck, G. K. Selleck, M. L. Selleck.

CINCINNATI, O.—Cincinnati Alco Motor Car Truck Co.; capital, $25,000; to deal in motor trucks. Incorporators: W. H. Peters, J. E. Keiding, G. H. Macduff.

CLEVELAND, O.—Pressed Steel Motor Car Co.; capital, $200,000; to manufacture and vend automobile parts and accessories. Incorporators: W. H. Milliken, F. M. Ossman, A. M. Heimberger, C. L. McConnell, L. C. Heimberger.

HARTFORD, CONN.—New England Car Co.; capital, $5,000; to deal in automobiles. Incorporators: H. T. Sheldon, A. E. Osborne, T. M. Steele.

INDIANAPOLIS, IND.—Indianapolis Auto Sales Co.; capital, $10,000; to conduct a taxicab and motor car sales business. Incorporators: H. S. Wilcox, D. H. Herr, B. W. Rout.

JOPLIN, MO.—Arnold Motor & Supply Co.; capital, $2,000; to deal in automobiles. Incorporators: J. L. Arnold, Ida Tweed Arnold, F. A. Snider.

NEW YORK CITY.—Eagle Sales Corp.; capital, $5,000; to deal in automobiles and supplies. Incorporators: Leo Weinberg, David Goldman, Isidore Goldman.

NEW YORK CITY.—Signal Motor Truck Co.; capital, $350,000; to manufacture motor trucks. Incorporators: J. S. Coates, W. C. Floyd-Jones, F. C. Canfield.

PIERRE, S. D.—F. P. Motor Wagon Co.; capital, $250,000; to manufacture automobiles. Incorporators: L. L. Stephens, T. F. Graham, E. E. Slade, W. G. Price, R. J. Reynolds.

RICHMOND, VA.—H. G. Wagner Auto Co.; capital, $3,000 to $25,000; to deal in automobiles. Incorporators: H. G. Wagner, F. W. Morehead, Frank Phillips.

SOUTH BOSTON, MASS.—Auto Co.; capital, $15,000; to deal in automobiles. Incorporators: J. A. Mebane, F. Mebane.

## GARAGES AND ACCESSORIES

ASHEVILLE, N. C.—Phillips Tire Co.; capital, $10,000; to manufacture automobile tires. Incorporators: W. L. Phillips, J. E. Craddock, C. D. Cooper.

BIRMINGHAM, ALA.—Birmingham Motor and Country Club; capital, $150,000; to build a clubhouse and a lake.

BROOKLYN, N. Y.—Noden's Truck Co.; capital, $10,000; general automobile trucking. Incorporators: Abraham Noden, B. H. Noden, L. F. Senke.

BROOKLYN, N. Y.—Whittemore Cab Co.; capital, $1,000; to engage in automobile cab business. Incorporators: W. I. Wiedeman, Albert Wald, C. F. Fuerst.

BUFFALO, N. Y.—Fedders Mfg. Co., Inc.; capital, $400,000; to manufacture automobile radiators and specialties. Incorporators: L. F. Fedders, J. M. Fedders, T. C. Fedders.

CLAYTON, N. Y.—Clayton Motor Repair and Supply Corp.; capital, $15,000; to repair automobiles and deal in accessories. Incorporators: W. M. McCawley, L. A. Phillips, A. C. Bakewell, Jr.

CLEVELAND, O.—Elastic Tread Tire & Wheel Co.; capital, $25,000; to manufacture an automobile tire. Incorporators: J. C. Murry, R. M. Morlenkopf, F. J. Axel, Peter Schneider.

CLEVELAND, O.—Hercules Lock Co.; capital, $1,000; to manufacture automobile specialties. Incorporators: H. A. Hauxhurst, George Bissell, R. T. Mitchell, R. Hall, M. T. Flannagan

DENISON, TEX.—Davis Livery & Motor Car Co.; capital, $10,000; to carry on an automobile livery business. Incorporators: E. E. Davis, Earl Wood, R. L. Aspley.

NEW YORK CITY.—Hampton Kerosene Carburetor Co.; capital, $150,000; to manufacture carburetors. Incorporators: W. Hampton, C. A. Eurr, O. H. Cacciola.

NEW YORK CITY.—Gaulois Tire Corp.; capital, $20,000; to deal in automobile tires. Incorporators: Jean Grenier, V. W. Cutting, Maurice Leon.

NEW YORK CITY.—Merrails' Air and Steam Engine Co.; capital, $150,000; to manufacture engine starters. Incorporators: William Brady, J. C. Heberer, W. A. Merrails.

NEW YORK CITY.—Motor Service Corp.; capital, $500; to engage in an automobile service. Incorporators: W. G. Smith, F. H. Merrill, Mabel Dittenhoefer.

NEW YORK CITY.—Schermerhorn Garage Co.; capital, $20,000; to carry on a general garage business. Incorporators: J. Ginsburgh, Leo Rosett, P. A. Lee.

OKLAHOMA CITY, OKLA.—Liquid Tire Tonic Co.; capital, $10,000; to manufacture a liquid that automatically heals punctures in automobile tires. Incorporators: F. B. Dean, H. N. Schofield, T. H. Williams.

STEVENS POINT, WIS.—Hydraulic Transmission Co.; capital, $45,000; to manufacture a hydraulic transmission. Incorporators: Arthur Beijer, Benjamin Beijer, J. P. Atwell.

TROY, N. Y.—Grand Street Garage Co.; capital, $3,000; to engage in garage business. Incorporators: S. W. Smith, W. G. Swartout, M. J. Cohen.

## CHANGES OF NAME AND CAPITAL

AKRON, O.—American Tire & Rubber Co.; capital increased from $200,000 to $500,000.

INDIANAPOLIS, IND.—Wizard Motor Co.; increase of capital from $50,000 to $100,000.

MILWAUKEE, WIS.—Feilbach Motor Co.; increase of capital from $20,000 to $50,000.

# New Agencies Established During the Week

## PASSENGER CARS

| Place | Car | Agent |
|---|---|---|
| Arlington, Wash. | Rambler | Neil Brown. |
| Blanchard, Ia. | Hupmobile | A. J. Joy. |
| Buffalo, N. Y. | Midland | Buffalo Midland Sales Co. |
| Centralia, Wash. | Ford | St. John & Titus. |
| Centralia, Wash. | Mitchell | St. John & Titus. |
| Centralia, Wash. | Studebaker | St. John & Titus. |
| Chicago, Ill. | R-C-H | Lincoln Park Auto Ex. |
| East Liverpool, O. | Buick | Tri-State Gar. |
| Groton, S. D. | Hupmobile | Geister & Sheldon. |
| Harrington, Wash. | Overland | R. R. Hutsell. |
| Junius, S. D. | Hupmobile | Innes & McGowan. |
| Kearney, Neb. | Empire | Franks & Kouer. |
| Kearney, Neb. | Great Western | Franks & Kouer. |
| Keene, N. H. | Metz | A. W. Dickerman. |
| Kellogg, Id. | Ford | Coeur d'Alene Auto Co. |
| Lewiston, Me. | Inter-State | Androscoggin Motor Co. |
| Lincoln, Neb. | Chalmers | L. E. Tait Auto Co. |
| Madison County, Neb. | Abbott-Detroit | W. H. Blakeman. |
| Montesano, Wash. | Rambler | W. H. Bush. |
| New York City | Panhard | Healy & Co. |
| Oakesdale, Wash. | Case | Linville Bros. |
| Oakesdale, Wash. | Ford | Linville Bros. |
| Oklahoma City, Okla. | Chalmers | Westcott & Magee. |
| Oakland, Cal. | Krit | C. F. Orra. |
| Olympia, Wash. | Reo | Blaine Mahom. |
| Olympia, Wash. | Stoddard | Blaine Mahom. |
| Olympia, Wash. | Stutz | Mottinger & Sauve. |
| Portland, Ore. | Empire | W. H. Peacock & J. Freeman. |
| San Francisco, Cal. | Mercedes | Rene J. Marx. |
| Seattle, Wash. | Imperial | Stratton & Waller. |
| Seattle, Wash. | Oldsmobile | C. R. Williams. |
| Spokane, Wash. | Metz | Baker Bros. |
| Spokane, Wash. | R-C-H | Inland Motor Car Co. |
| Sprague, Wash. | Metz | W. R. Lee. |
| Tacoma, Wash. | Apperson | F. G. Swanton. |
| Tacoma, Wash. | Michigan | Michigan Auto & Buggy Co. |
| Toronto, Ont. | Norwalk | Norwalk Motor Car Co. |
| Utica, Neb. | Hupmobile | Utica Auto. Co. |
| Washtucnay, Wash. | Reo | G. W. Volz. |

## COMMERCIAL VEHICLES

| | | |
|---|---|---|
| Cincinnati, O. | Alco | Cin. Alco M. C. & Truck Co. |
| Hartford, Conn. | Koehler | L. M. Camp. |
| Portland, Ore. | Dart | W. H. Peacock & J. Freeman. |
| San Diego, Cal. | Mack | H. A. Seller. |
| San Francisco, Cal. | Wagenhals | Woodman Motor Truck Co. |
| Tacoma, Wash. | Dart | H. W. Doherty. |

# Accessories for the Automobilist

THE FAWKES traffic signal, made by the Fawkes Auto Co., Minneapolis, Minn., is a small searchlight mechanism attached to the front of the car by a cross bracket, Fig. 4. The signal itself consists of a vertical post mounted in a socket and turnable in the same, in response to an operating mechanism from the steering wheel, and a horizontal rod carried by the vertical one and having at its end an electric bulb capable of emanating a bright light. By means of a switch the bulb is turned on or off and a small lever on the steering wheel, connected to the vertical rod by steel rodding and universal connections, are used to turn the horizontal bulb-carrier toward the right or left, depending on whither the driver means to steer the car.

## Thick-Tread Inner Tube

The Kokomo Rubber Co., Kokomo, Ind., manufactures the Kokomo thick-tread inner tube, Fig. 1. This tube differs from others by having the half-ring contacting with the inside of the tread portion of the casing made considerably thicker than the inner half-ring, so that not only is the interior space of the tube lessened and consequently the amount of air needed for proper inflation reduced, but the probability of blowouts, punctures and short life are lessened by the increased strength of the tube. The cross section of the tube, as Fig. 1 shows, is oval shaped to fit well into the casing.

## Vellumoid Packing Material

A novel material for gaskets, packings, leather imitations and other applications has been invented by Charles D. Brown & Co., Inc., 49 Federal street, Boston, Mass. Vellumoid is made of a fiber related to paper, and is impregnated with an oily material to make it waterproof. While not recommended for contact with hot steam under pressure, it is applicable to such uses as intake manifold gaskets, etc.

## Hemmeter Visible Spark-Gap

A small device for continuous inspection of the motor ignition system has been designed by the Hemmeter Spark Gap Mfg. Co., Pontiac, Mich. This gap is seen in Fig. 2, and consists of a small glass cylinder held by two hard-rubber plates which are connected by brass screws, and two screws extending through the centers of both plates so as to form a narrow gap, which measures about .02 inch, or even somewhat less. The high-tension wire from the magneto or coil is connected to the upper inclosed screw, and the lower is screwed on to the plug terminal by means of a small connector. If the ignition system is functioning, a spark is formed between the two inclosed screws at each ignition stroke of the motor.

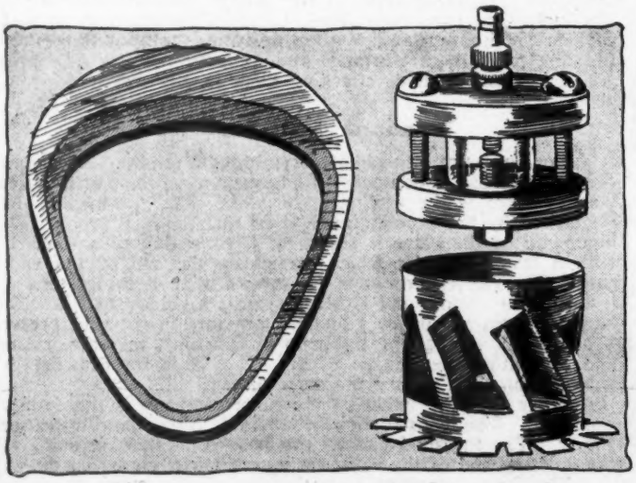


Fig. 1—Kokomo tube. Fig. 2—Hemmeter spark gap. Fig. 3—Egyptian mixer

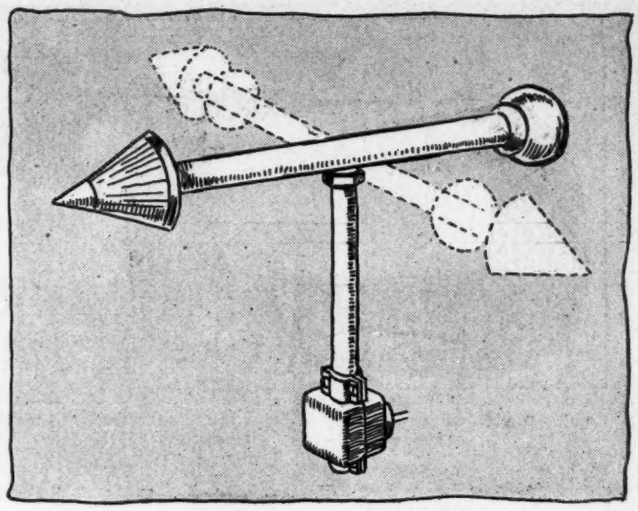


Fig. 4—Fawkes electric turning signal

## Egyptian Mixer for Intake Pipe

The R. D. Loose Mixing Chamber Co., 110 North Fifth street, Springfield, Ill., manufactures the Egyptian mixer, a small device which is fitted into the mixture intake pipe of the motor, between carbureter and manifold, in order to break up the liquid globules carried along by the mixture formed in the carbureter. The mixer is made of a single, cylindrical piece of sheet brass of the carbureter outlet diameter. This cylinder, in the making of the mixer, is cut on a slant as in Fig. 3, and then along one circular edge of the cylinder in twelve places. Furthermore, six sections of the cylinder wall are cut and bent inside so as to form blades which break up the mixture and tend to impart a rotating motion to it.

## Prest-O-Starter Demonstrator

The Prest-O-Lite Co., Indianapolis, Ind., is providing its agents with demonstrating models of the Prest-O-Starter, which consists of a wooden frame provided with fixtures necessary if a starter of this type is used on the car. The upper half of the wooden frame represents the dash of the car holding the starter pump, etc., and a lower part supports the tank as well as the reducing valve. In making the demonstration the stand is placed beside the front mudguard of the car and connected to the cylinders through flexible brass tubing having injectors which are inserted in the priming cup openings. If there are no priming cups in the cylinders, combination sparkplugs which are formed in themselves with priming cups are used in place of the ordinary plugs.

## Miller Telescoping Grease Cup

A telescoping type of grease cup, designed by the inventor of the Miller grease gun, is being placed on the market by Asch & Co., 1777 Broadway, New York City. This accessory consists of four principal parts: First, the main body of the cup

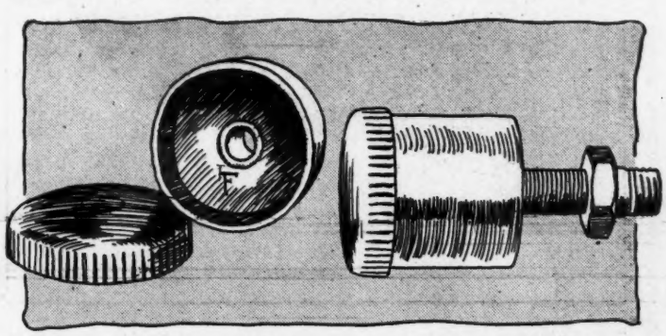


Fig. 5—Miller telescoping grease cup

Fig. 6—Dayton automobile spring spreader for springs 2.875 inches in width, as well as the narrowest types

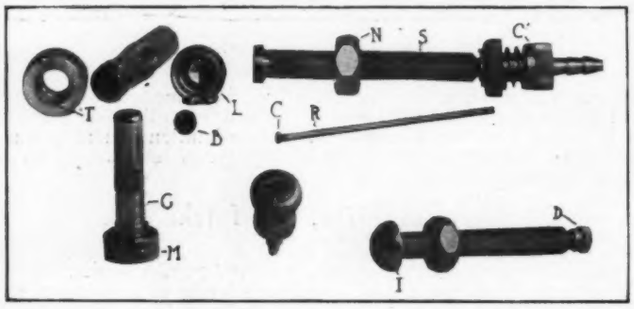



Fig. 7—Standard tire valve and slip-off casing, useful when a driver is accustomed to frequently test the pressure

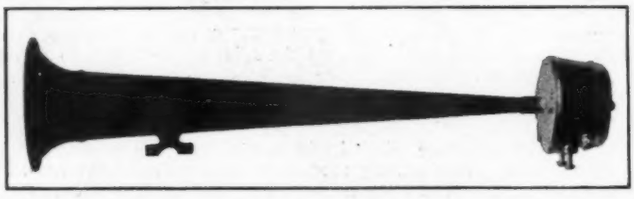


Fig. 8—Maxeff electric horn, specially designed for mounting under the hood

Fig. 9—Maxeff electric horn of conventional design for usual type of mounting

comprising a cylinder with a bottom F which is secured to the outlet pipe of the cup; second, an outer cylinder screw-threaded so as to work along the outside of the inner cylinder; third, a cap for the cup, and, fourth, a nut for pressing a cup-leather washer against the bottom of the cup to prevent leakage of the grease. The outer cylinder, if it is turbed, is made to travel up or down along the inner cylinder. To fill the grease cup, the cap is removed and the outer cylinder is screwed up as far as possible, its coming off the inner being prevented by a rivet. Then the space inside the outer cylinder is filled and the cap is replaced. When the outer cylinder is now screwed down, the bottom of the inner one is moved up, relatively, decreasing the volume of the space in which the grease is contained and forcing the latter out of the cup by way of the outlet pipe. Practically the entire volume of grease in the cup is thereby available.

## Carr Gasoline Warning Signal

Automobilists who have found themselves 10 miles from the nearest garage, without enough fuel in the tank to go on, will appreciate the advantages of the Carr signal gauge. This device consists of a float tube containing a float, which is inserted in the gasoline tank, a contact in the top portion of the float tube and an annunciator mounted on the dash, under the hood or wherever desired. If the float falls to a certain point due to the decreasing level of the gasoline, the end of a lever to which it is secured by a string is drawn down, whereby its other end is made to touch a metal contact, thereby closing an electric circuit and ringing the annunciator. A switch on the dashboard may be used to turn off the signal after the driver has noticed it and knows that there is only a limited quantity of gasoline left in the tank.

## Dayton Malleable Spring Spreader

The Dayton Malleable Iron Co., Dayton, O., is the maker of the spring spreader, Fig. 6, which is composed of a steel clamp, a steel point attached to one end, a screw threaded through the other and a wedge carried by the inner end of the screw. The point is centered between the leaves of the spring and by turning the wing nut, the wedge carried by the screw may be driven between the leaves to such an extent as to separate them and permit of lubricating the ordinarily contracting surfaces. The maximum clearance is 2.875 inches, so that the spreader is applicable to springs of this width, while it can also be used for the smallest car springs on the market.

## Maxeff Electric Automobile Horn

Another electric horn has been brought out, thanks to the manufacturing activities of the Maxeff Electric Horn Co., 814 Woodward avenue, Detroit, Mich. This horn is made in two principal types, regular, Fig. 9, and under-hood, Fig. 8. The horns are of the motor type, and the generating device is attached at the end of the under-hood type or at the side, as in the case of the regular design. Control is by a push-button fixed to the steering wheel, from where the wiring is taken through a flexible casing to the horn. Slip-on terminals are used to connect the wires to the motor terminals.

## Usoline Metal Cleaning Cloth

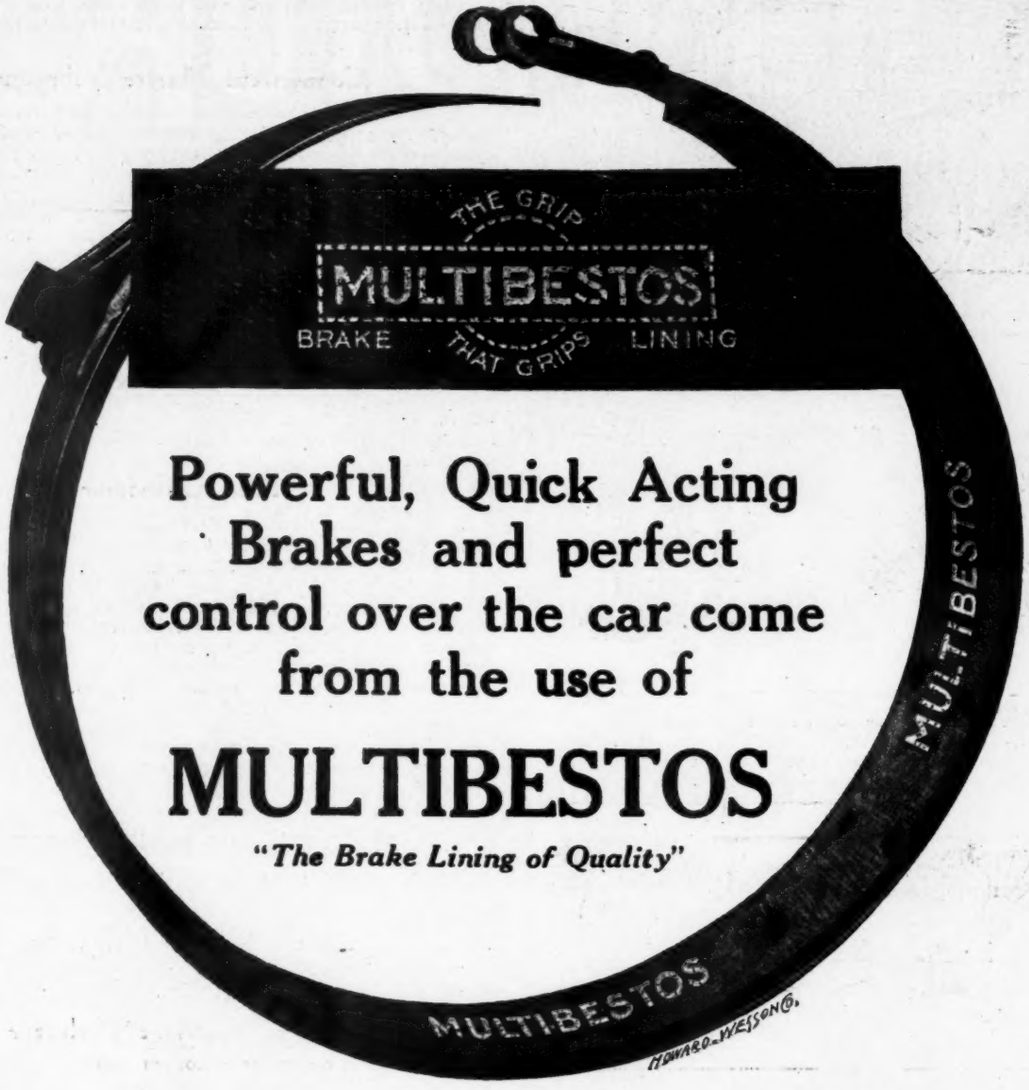
Usoline polishing cloth is the latest product in the Oil Products Co., Inc., New York City. This material consists of a fabric impregnated with a polishing compound, removing dirt from metal surfaces and imparting a fair degree of polish to them, without attacking them in any way.

## Standard Tire Sundries

Various new tire fittings have been brought out by the Standard Engineering Co., Woonsocket, R. I., makers of the Potter valve. One of them is the new style of valve, Fig. 7, which is distinguished by the peculiar method of making it airproof. The inner end of the valve is shown at I, consisting of a steel cap with a transverse slot which screws on the end of the valve casing S. The rod or stem R, formed with a conical end C, is inside the casing, and C bears against a rubber ball B. The latter is contained inside I and the pressure in the tube presses B against C, maintaining tightness of C against the valve casing and preventing the leakage of air. Nut N is for drawing the valve casing tight against the inner tube.

Another specialty made by the same company is the connections C1. The construction is obvious from the illustration, Fig. 7. The threaded end of the hose connection screws over the inflating end of the valve casing ordinarily closed by the cap D. The fitting screwing over the end of the casing is pressed in place by a coiled spring.

The gauge cap G has been designed to fit over the casing S

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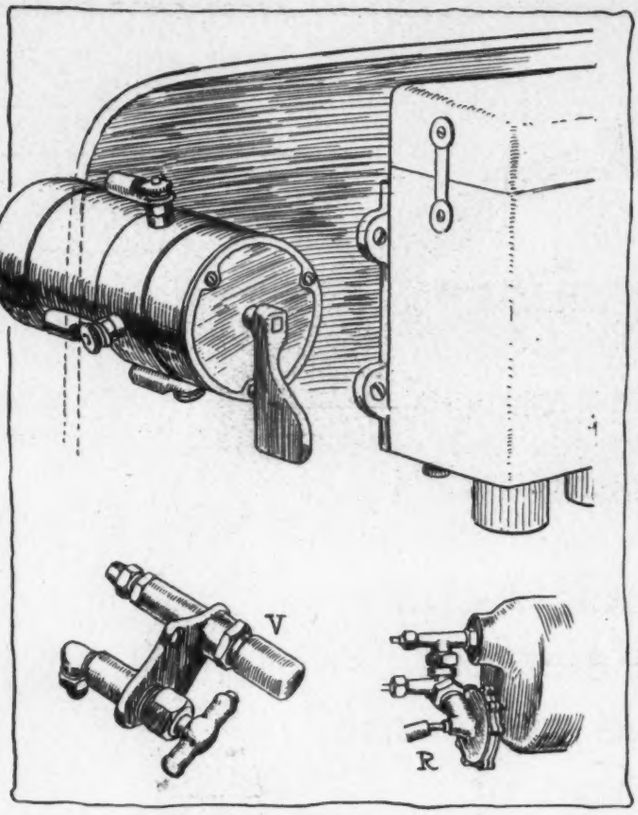


Fig. 10—Connecticut master vibrator and combined dash switch. Fig. 11—Prest-O-Primer reducing valve R for attachment to acetylene tank and foot operated valve V on dash

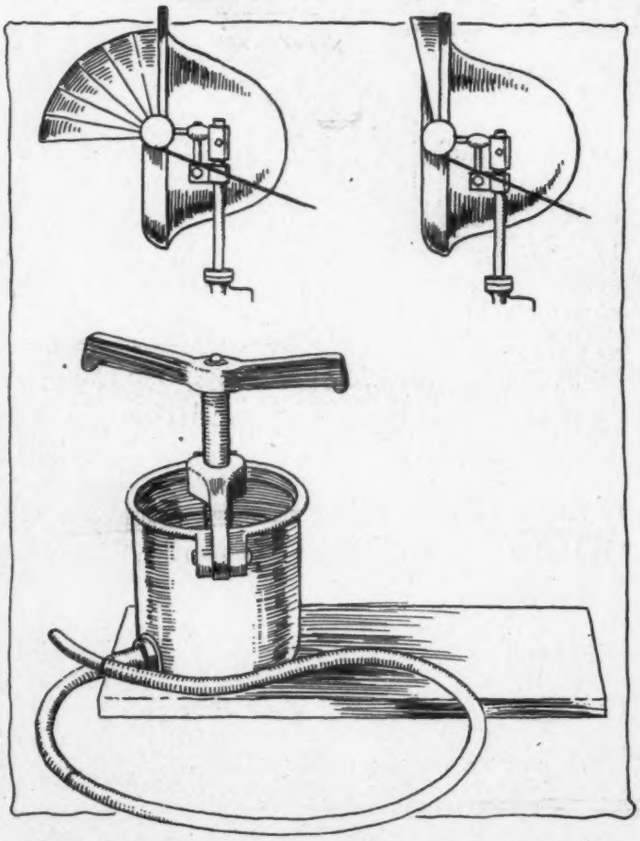

Fig. 12—Brown visor type of headlight deflector in raised and lowered positions. Fig. 13—Lee grease pot fitted with flexible steel hose for garage use

in cases where the drivers are in the habit of frequently testing the pressure in the tires. Nut M screws over the thread of S and inside of it, a short coiled spring R is in place. The latter may be depressed for the purpose of forcing the end of G out of or into the nut M, when desirous of measuring the air pressure, or after having done so. All these specialties are sold in the Metropolitan territory by Asch & Co., 1777 Broadway, New York City.

## Connecticut Master Vibrator

To overcome the trouble of frequent adjustment that is associated with the use of an ignition system in which all four cylinders are provided with separate spark coil vibrators the Connecticut Telephone and Electric Co. have brought out a master vibrator. This device, in which is incorporated a throw-over switch, is primarily designed for use on Ford cars fitted with the flywheel type of magneto. This master vibrator is shown in Fig. 10. It is intended for mounting on the dash in such a position that the casing projects inside the hood, with the switch handle on the driver's side of the dash.

The wiring is simple, it being only necessary to connect the three terminals directly to the dash coil, magneto and battery respectively. The vibrators on the four-cylinder coil should be short-circuited by screwing down tightly and connecting the vibrator and bridge on each of the four units with a short length of copper wire. The switch lever is removable, having a locking ball for holding it in place. When removed the ignition is locked.

## Prest-O-Primer

In order to facilitate the starting, in cold weather, of engines fitted with electric or compressed air cranking devices the Prest-O-Lite Co., Indianapolis, Ind., are marketing an acetylene primer for attachment to the Prest-O-Lite tank. This device, shown in Fig. 11, is called the Prest-O-Primer and consists essentially of a reducing valve R inserted in a pipe connection between the tank and the inlet manifold, permitting the introduction of small quantities of acetylene at a very low pressure—2 ounces—to cause the initial explosions. It is operated by means of a second valve V in the circuit, located on the dash and actuated by foot. Besides this push valve, which is of the spring-return type, there is a screw valve mounted alongside as a double insurance against gas leakage. The makers claim that this priming device does away with the necessity of gasoline priming when the engine is refractory and state that if the engine is allowed to run about 20 seconds on acetylene it will be found to be warmed sufficiently to obtain the desired response from the carbureter, however cold the weather. A special two-way union is furnished for attachment to the tank, where the latter also supplies the gas for lighting. By the use of a reducing valve the pressure of gas is such that under no circumstances can an explosion of greater force occur than is obtainable with gasoline in the ordinary way, so that no undue strains are imposed on the engine.

## Brown Headlight Deflector

To moderate the luminant effect of the headlights without the use of a dimming agent the Brown Co., Syracuse, N. Y., has designed the headlight deflector, Fig. 12. It consists of a multiple unit visor pivoted at the ends of the horizontal diameter of the headlight lense rim. The sections are so fixed that by turning the pivoting member they are one by one lowered or raised, so that the upper half of the lamp is blinded and the rays are deflected downward, while the lower still affords sufficient light to illuminate the road. A cable from the dash operates the visor.

## Lee Grease Pot

A substantial greaser for garage use is being manufactured by Henry B. Lee, New London, Conn. This design differs from the conventional grease gun in two respects. First, it is much larger, and, second, the lubricant is ejected through a flexible steel hose, thereby facilitating the lubrication of the more inaccessible points of the chassis. The pot is 7 inches diameter by 7 inches high and is capable of dealing with five pounds of grease. Pressure is applied by means of a 1-inch screw with a large lever handle. There are no loose parts, the top merely hinging for the operation of refilling. Some idea of its substantial construction may be gathered from the illustration, Fig. 13. The walls of the pot are .5 inch thick, and the total weight of the device is 25 pounds. It is stated that the contents of this grease pot can be discharged in 2 minutes. Two types are marketed, No. 1 being designed for use with light grease and heavy oil, and No. 2—not shown—being arranged with a geared top so as to be capable of dealing with the heavier greases. As supplied these grease pots are mounted on a floor-board 8 inches by 20.